SONY®

DIGITAL COLOR PRINTER
UP-D70/D70A

SERVICE MANUAL

Vol. 1 (1st Edition)

MANUAL STRUCTURE

Purpose of this manual
This manual is the Service Manual Vol.1 of the digital color printer UP-D70/D70A. This manual contains the operating instructions, service information, mechanical operation, circuit operation description, service mode and trouble shooting.

Related manuals
In addition to this Service Manual Vol.1, the following manual is provided.

- **Service Manual Vol.2**
  Part No. 9-977-350-21 (for J, UC, CE)
  Contains the semiconductor pin assignment, spare parts, block diagrams, circuit diagrams and mounted circuit boards.

- **Service Manual**
  UPK-8802RT (RASTER INTERFACE KIT)
  Part No. 9-974-788-01 (for J/CE)
  　　　　　 9-974-777-01 (for UC)

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SONY

3-864-122-**11** (1)

Digital Color Printer

Operating Instructions **Page 2**

EN

UP-D70
UP-D70A

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SECTION 1
OPERATING INSTRUCTIONS

This section is extracted from operation manual.

English

Owner's Record

The model and serial numbers are located at the rear.
Record these number in the space provided below.
Refer to these numbers whenever you call upon your
Sony dealer regarding this product.

Model No. _____
Serial No. _____

WARNING

To prevent fire or shock hazard, do not expose the unit
to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer
servicing to qualified personnel only.

For the customers in the U.S.A.
This equipment has been tested and found to comply
with the limits for a Class A digital device, pursuant to
Part 15 of the FCC Rules. These limits are designed to
provide reasonable protection against harmful
interference when the equipment is operated in a
commercial environment. This equipment generates,
uses, and can radiate radio frequency energy and, if not
installed and used in accordance with the instruction
manual, may cause harmful interference to radio
communications. Operation of this equipment in a
residential area is likely to cause harmful interference in
which case the user will be required to correct the
interference at his own expense.

You are cautioned that any changes or modifications not
expressly approved in this manual could void your
authority to operate this equipment.

This device requires shielded interface cables to comply
with FCC emission limits.

Only UP-D70A

As an ENERGY STAR
Partner, Sony Corporation
has determined that this
product meets the
ENERGY STAR guidelines
for energy efficiency.

**Outline of the International ENERGY
STAR Office Equipment Program**
The International ENERGY STAR Office Equipment
Program is an international program that promotes
energy saving through the use of computers and
other office equipment. The program backs the
development and dissemination of products with
functions that effectively reduce energy consumption.
It is an open system in which business proprietors
can participate voluntarily. The targeted products are
office equipment such as computers, displays,
printers, facsimiles, and copiers. Their standards and
logos are uniform among participating nations.

Table of Contents

About this Manual

This manual covers the following UP-D70 series digital color printers.
• UP-D70
• UP-D70A

Whenever the operation or any other item differs between the modes, this manual clearly describes those differences.

Organization of this manual

This manual is divided into four chapters. This section explains the organization of this manual.

Introduction
Describes the features and system configuration of the digital color printer. Also provided is information on the location and function of parts.

Preparation
Explains the steps involved in setting up and connecting the printer prior to getting started —checking the supplied accessories and assembly. Once all assembly and all connections have been made, there should be no need to perform these operations again during normal printing operations.

Operation
Describes loading of the ink ribbon cassette and print paper and actual printing operation. Also provided is information on setting the print quantity and adjusting the printouts and gray balance.

Others
Provides technical information on the printer, how to handle error messages displayed in the printer window display, and how to deal with paper jams. Also the index will assist you to locate the necessary section quickly. Refer to this chapter when questions arise or problems occur.

Conventions used

Cross reference
Throughout this manual you will find the references to other sections of the manual that contain related information.

Important note
Be sure to read the sections of the manual marked **Note** . They explain points that you should be aware of to operate the printer correctly and prevent malfunctions.

Trademarks
PostScript is the trademark of Adobe Systems Incorporated.
Macintosh is the trademark of Apple Computer, Inc., USA.
MS-Windows and Windows95 are the trademarks of Microsoft Corporation, USA.

System Overview

The Sony UP-D70/D70A digital color printer is designed to reproduce computer images on A4-size and Letter-size print paper.
You can print out image data of MS-Windows or Macintosh graphics application software in high resolution (300dpi) and 256 shades of gray or in full color (16,700,000 colors).
Installing the TMax P891[a] Color Connectivity Controller to the printer explanstion slot makes the printer to fully support the PostScript ™, a widely used by computers, printers, and imagesetters.

System Configuration

The following shows an example printer system configuration.

Computer
Controls the printer operations.

Digital color printer
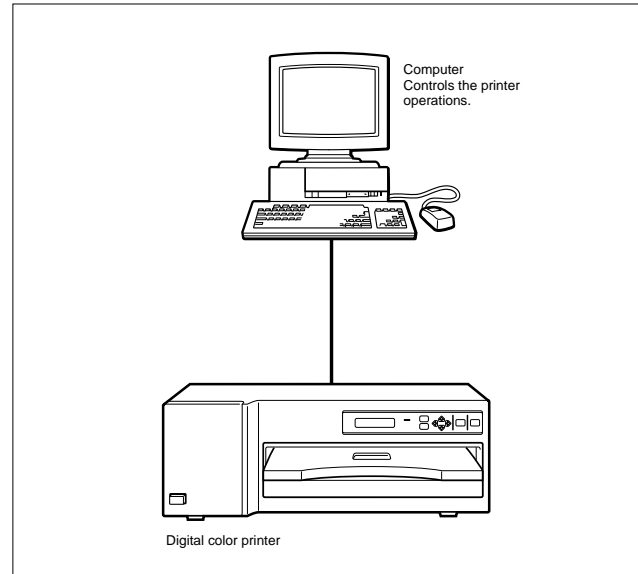
About the instruction manual of the printer driver

The instruction manual for the printer driver is stored on the supplied CD ROM. For detailed information, read the ReadMe file on the CD-ROM.

a) The Color Connectivity Controller TMax P891 is available from TopMax Corporation.

Location and Function of Parts and Controls

For details, refer to the pages indicated in parentheses.

Front
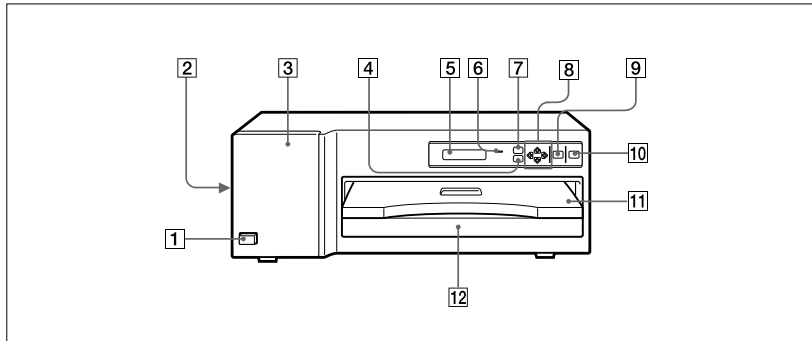
1 ①POWER switch
Press to turn the printer on or off.

2 **Fan cover (9, 28)**
Provided to prevent the printer from dust.

3 **Ribbon door (14)**
Pull the tab (marked with PULL) on the top
on the ribbon door to open it when loading an
ink ribbon cassette.

4 **PRINT QTY (quantity) button (22)**
Press this button to display or close the print
quantity setting menu in the printer window
display.

5 **Printer window display**
Displays the status messages. In menu
operation, the print quantity setting menu,
printout adjust menu or gray balance adjust
menu is displayed.
Also, SCSI device type is dipslayed.
If an error occurs, a corresponding error
message is displayed.

6 **ALARM indicator (32)**
Lights in orange when the ink ribbon or print
paper is exhausted, the paper jams, or another
problem occurs.

7 **MENU button (13, 23, 25)**
Press this button to display or close the
printout adjust menu, gray balance adjust
menu and SCSI device type setting menu in
the printer window display.

8 **Cursor control buttons (13, 22, 23, 25)**
Use these buttons to increase or decrease a
value and level shown on the menu, or scroll
up and down through a menu.

9 ▽ **STOP button (20)**
Press this button to stop printing part-way.

10 ▭**PRINT button (19, 20, 22)**
Press this button to print the image data
stored in the memory of the printer.

11 **Paper cover (9)**
Printouts are ejected here.

12 **Paper tray (9)**
Load print paper here. Press the point
marked with PUSH to remove the paper
tray.

Rear
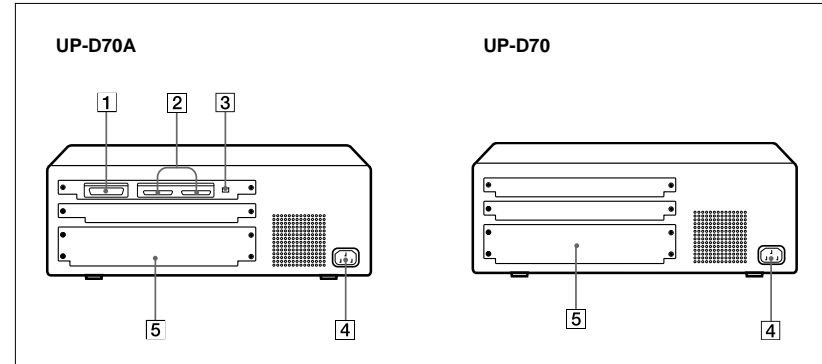
UP-D70A   **UP-D70**

1 **PARALLE DATA IN (Amphenol 36-
pin) (10) (only UP-D70A)**
Used to connect a Windows computer via the
parallel interface, using the parallel interface
cable. (not supplied)

2 **SCSI/Centronics interface board and
memory board (11) (only UP-D70A)**
Used to connect a Windows or Macintosh
computer or another SCSI device, through the
SCSI cable. The other connector is loop-
through connector. If either of the two
connectors is not being used, set the
terminator of the DIP switch to ON.
(See "Setting the DIP Switch" on page 11.)

3 **DIP switch (11) (only UP-D70A)**
Used to set the SCSI ID number and the built-
in terminator to ON or OFF.
(See "Setting the DIP Switch" on page 11.)

4 ∼**AC IN connector (12)**
Used to connect to a wall outlet, using the AC
power cord supplied.

5 **Expansion slot for Color Connectivity
Controller**
Remove the cover and insert the TMax P891
Color Connectivity Controller (not supplied).
For detailed information on how to insert, see
the instruction manual supplied with TMax
P891.

Preparation

Supplied Accessories

This printer is packed together with the following accessories. Check that nothing is missing from your package.

Paper tray (1)

Paper cover (1)

Ink ribbon holder (1)

AC power cord (1)

Fan cover with a filter (1)

Fan cover   Filter

Bottom cover (1)

CD-ROM (1)
Operating Instructions (1)
Warranty Card (1)
Registration card (only UP-D70A)
SOFTWARE LICENSE AGREEMENT (only UP-D70A)
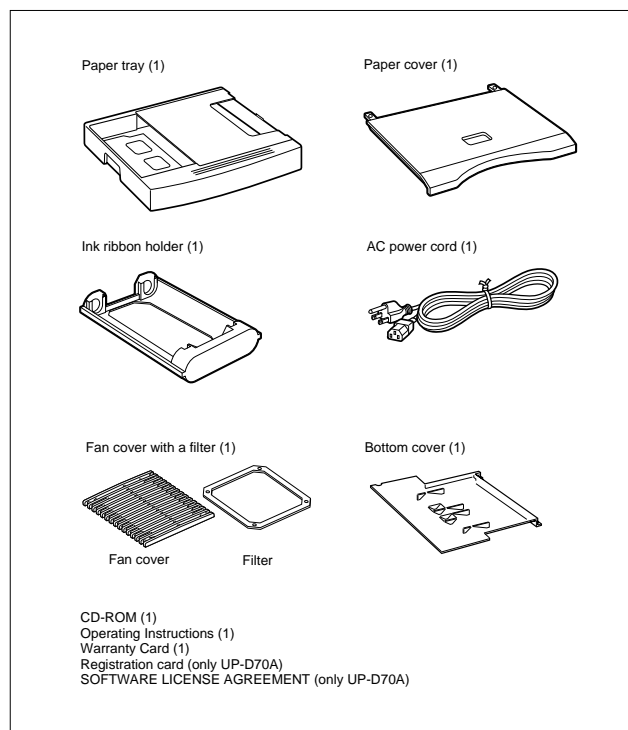
Notes
• Retain the original carton and packing materials in case you have to transport this unit in the future.
• When transporting the pritner, lock the thermal head. (For detailed information on how to lock, see page 28.)

Assembly

Mount the supplied ink ribbon holder, paper tray, paper cover, bottom cover and fan cover.

Note
You cannot mount the ink ribbon holder when the thermal head is locked.
Before assembling, turn on the power of the printer. The thermal head is unlocked and you can mount the ink ribbon holder.
When transporting the pritner, lock the thermal head. (For detailed information on how to lock, see page 28.)

Fan cover with a fiter
(page 28)

Paper cover

Bottom cover

Ink ribbon holder (page 14)

Paper tray (page 17)
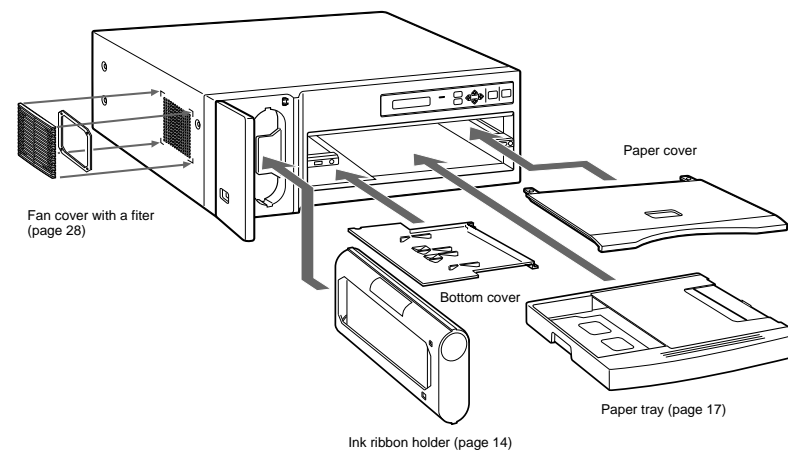
Connections

This section introduces the connections of the **UP-D70A**. For the connection of the **UP-D70**, see the instruction manual supplied with the TMax P891 Color Connectivity Controller.
For details, contact your Sony dealer.

Connecting the Computer

The **UP-D70A** connects to either of the computer Windows or Macintosh via the parallel interface. The **UP-D70A** can also connect to the Macintosh computer via the SCSI interface.

Notes
• Be sure to connect one printer to one computer. Do not connect two computers to the printer.
• Do not connect the computer equipped with the SCSI interface and parallel interface to both of the PARALLEL DATA IN connecter and SCSI connecter of the printer at the same time.
• Before connecting the cable, make sure to turn off the power switches on your computer and any peripheral equipment.
• Grasp the connector at the end of the cable, and firmly insert it into the socket.
• The total length of the SCSI cabling used with a single-host computer should be less than 6 meters.
• The parallel data cable should be less than 3 meters long and should conform to Centronics specifications for printer cables.
• Avoid sending parallel data to the printer while the printer is processing SCSI commands, and vice versa.
• Cable connection requirements vary depending on computers and peripherals. For the details of your installation, please refer to the manuals for your computer and peripherals.

When connecting a printer via the parallel interface

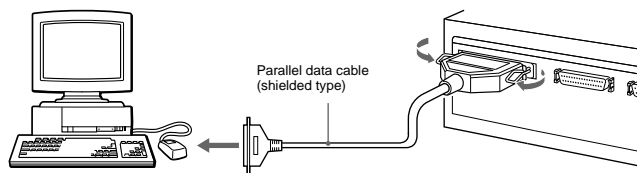Parallel data cable (shielded type)

When connecting a printer via the SCSI interface

SCSI cable (shielded type)
(50 pin full - 50 pin half pitch)
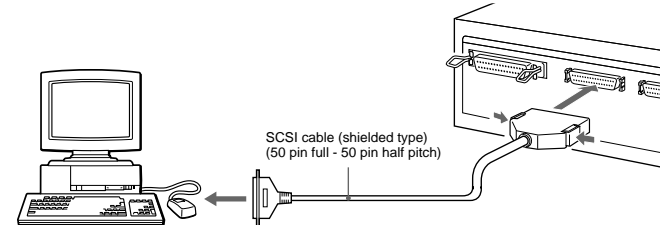
Note
If the printer is connected at the physical end of the SCSI bus, set the built-in terminator to ON. (See page 12.)

Installing the Printer Driver Program

The printer driver program should be installed before starting operation.
The instruction manual for the printer driver is stored on the supplied CD-ROM.
For details, read the ReadMe file on the CD-ROM.

Setting the DIP Switch

The DIP switches on the rear panel of the **UP-D70A** determine the on/off state of the internal SCSI bus terminator and the SCSI device ID number.
As shipped from the factory, the DIP switches are set up as follows:

Terminator ON/OFF setting
If printer is located at the physical end of the SCSI bus, this switch should be set to ON. Otherwise, if another device is at the end of the bus, this switch should be OFF.

TERMINATOR
SCSI ID
ON 4 2 1
(Factory setting)
OFF 0 0 0
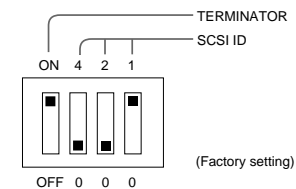
Switch	ON	OFF
TERMINATOR	The internal terminator is ON.[a]	The internal terminator is OFF.

a) Factory setting

Connections (Continued)

SCSI ID Setting

The SCSI ID selection must be different from any other device on the bus. If two SCSI devices have the same ID, a malfunction will occur.

SCSI ID	SCSI ID Switch		
	4	**2**	**1**
0	0	0	0
1a)	0	0	1
2	0	2	0
3	0	2	1
4	4	0	0
5	4	0	1
6	4	2	0
7	4	2	1

a) The SCSI ID has been set to 1 at the factory.

Connecting the AC Power Cord

Instruction in this section is common to **UP-D70** and **UP-D70A**.
Connect the supplied AC power cord to the AC IN connector on the rear of the printer and then connect the cord to the wall outlet.

To AC IN

AC power cord (supplied)

To wall outlet
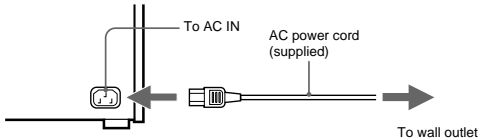
Note

Operate the printer only on 120 V AC, 50/60 Hz.

Setting the SCSI Device Type

You need to set the SCSI Device Type, if an error for IOS. VXD occurs when the **UP-D70A** is connected to the computer with Windows 95.
Or, obtain the updated IOS. VXD device driver and install the device driver in your computer.

1 While pressing the MENU button, turn on the power or the printer.

2 Check that the SCSI Device Type is set to the system used in the printer window display.
When your compuer is Windows 95, SCSI DEVICE TYPE should be set to 3.

```
SCSI Device Type
  2   <3>
```

3 If the setting is incorrect, set to the SCSI DEVICE TYPE to 3 using the ⇦ or ⇨ button.

4 Turn off the printer.
The SCSI DEVICE TYPE is set to 3.

Before Printing

This section describes the operations that must be performed prior to starting printing. This explanation assumes that the printer has already been installed and that all connections have been made.

• Loading an ink ribbon cassette (on this page)
• Loading the print paper (page 17)

Once these operations have been completed, there should be no need to perform them again during routine printing.

Notes

• When replacing the ink ribbon or paper, do not turn off the power. Turning off the power will cause the image stored in the memory to be lost.
• After replacing the ink ribbon or paper, perform the gray balance adjustment. (See "Adjusting the Gray Balance" on page 25.)
• Use the ink ribbon suitable for the type of print print material. Before attempting to load an ink ribbon, make sure that the combination of the ribbon and paper is compatible. ("Ink Ribbon and Print Paper" on page 30.) If the printer detects an incompatible combination, an error message appears in the printer window display and operation is disabled.
• **Use only ink ribbon and print paper designed for use with this printer. Failing to do so is likely to result in unsatisfactory printing or malfunctions.** ("Ink Ribbon and Print Paper" on page 30.)

Loading an Ink Ribbon Cassette

Load the ink ribbon to the supplied ink ribbon holder, and load the ink ribbon cassette (referring to the ink ribbon holder loaded with the ink ribbon) to the printer's ribbon compartment.

Notes

• When you use the printer at the first time, the thermal head was locked at the factory. Turn on the printer first to unlock the thermal head, then start to load an ink ribbon cassette. (See page 28.)
• Once an ink ribbon has been completely used, replace it. Ink ribbons are not reusable.
• Do not rewind the ink ribbon for reuse.
• Do not touch the ink ribbon or place it in a dusty location. Finger prints or dust on ink ribbon will result in imperfect printing.
• When transporting the printer, remove the ink ribbon cassette and lock the thermal head. (For detailed information on how to lock the thermal head, see page 28.)

1 Open the ribbon door by pulling the tab on the ribbon door and marked with PULL.
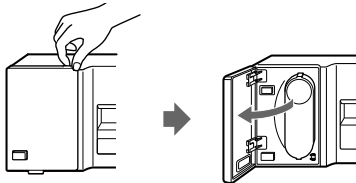
2 Remove the ink ribbon cassette by pressing the EJECT button. The ink ribbon cassette pops out.
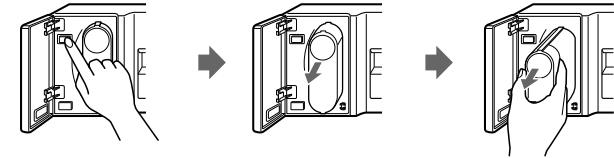
Note

Never put your hand into the ink ribbon compartment. The thermal head becomes very hot. You may burn yourself if you touch it.

3 Detach the used ink ribbon from the ink ribbon holder.

① Remove the spool with the ink ribbon, while pressing in the arrow direction.

② Remove the other spool.
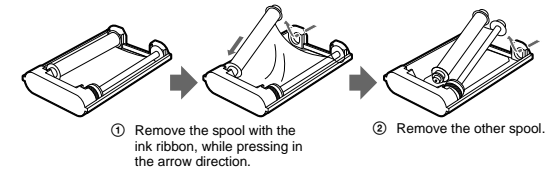
4 Load the ink ribbon to ink ribbon holder.

① Load the spool holding the ink ribbon into the right-hand part of the holder, while pressing in the arrow direction.

Bar code

Ink ribbon holder (supplied)

② Fit the other spool into the left-hand part of the holder.
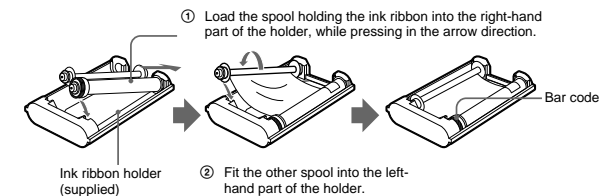
5 Remove any slack from the ink ribbon. If the ribbon is left slack, it may be crumpled and damaged when inserted.

"Start" position marker

Wind the spool until the "Start" position marker faces upward.
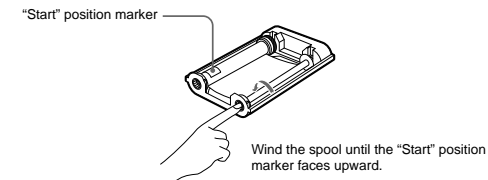
(Continued)

Before Printing (Continued)

6 Insert the ink ribbon cassette firmly until it stops.
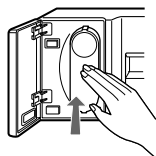
SONY mark faces forwards.

7 Close the ribbon door.
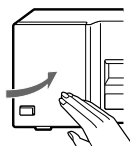
If your ink ribbon should tear
Repair the tear with transparent tape. There should be no problem with using the remaining portion of the ribbon.

Transparent tape

Remove any slack.
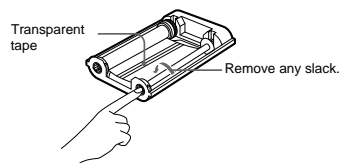
Notes When storing ink ribbons
• Avoid placing the ink ribbon in a location subject to:
  – high temperatures
  – high humidity
  – excessive dust
  – direct sunlight
• Store partially used ink ribbon in its original package.

Loading the Print Paper

Load the print paper by the following procedure. Be careful not to touch the printing surface of the paper.

Note
When loading the print paper, do not turn off the power. If you turn off the power, the image data stored in the memory will be lost.

1 Push PUSH on the paper tray.
The paper tray is ejected.

Remove the printing surface protection sheet, if any.
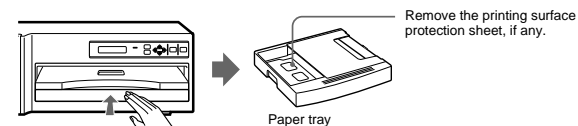
Paper tray

2 Open the tray cover and place the print paper in the paper tray.

Reverse side with printed logos

When placing the A4+ print paper, pull up the tab and slide the spacer outward.

Print surface protection sheet

Riffle the paper.

Place the print paper in the paper tray with the printing surface (shiny side with no legends) and its protection sheet facing down.
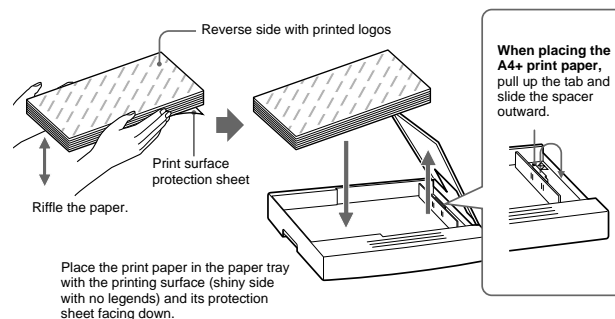
Notes
The number of the print paper is the same as the number of the print paper that one roll of the ink ribbon can afford. Usually the ink ribbon and paper have run out at the same time. However, if you add only the print paper, pay attentions to the following.
• The paper tray holds up to the total number of sheets contained in a package sheets of paper. If you exceed this limit, paper jams may occur.
• If you load the paper that is not compatible with the ink ribbon used, the gray balance may be changed.
• Load the paper so that it lays flat in the paper tray. If the paper is curled, it will overflow the paper tray and the printing position may shift. If this happens, load fewer sheets in the paper tray.

(Continued)

Before Printing (Continued)

3 Close the tray cover and slide the paper tray into the printer until it clicks into place.
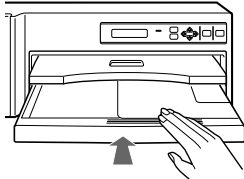
Notes on storing print paper

• Avoid storing the print paper in a location subject to:
  – high temperatures
  – high humidity
  – excessive dust
  – direct sunlight
• Use the original package for storing unused paper.

Printing

Before printing

• Ensure that the printer is properly connected to the computer (page 10).
• Ensure that the combination of the ink ribbon and print paper is correct (pages 14 and 17).
• Ensure that the ink ribbon cassette and print paper are properly loaded (page 30).

Printer window display   STOP button

2

Paper outlet

1
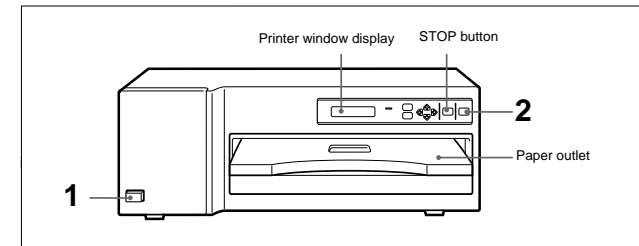
1 Turn on the power of the printer and computer.
When the printer is in standby status, the following message appears in the printer window display.

```
READY
  A4+  QTY   1
```
The size of the paper being loaded
Number of copies to be printed

Notes

• When the printer is connected to the computer through the SCSI bus, turn on the power of the printer before turning on the computer.
• Never turn the printer on or off while the computer is accessing its hard disk, floppy disk or another SCSI device.

2 Send the image data from the computer to the printer, then enter the print command or press the PRINT button of the printer.
For details on **UP-D70A**, also see the ReadMe file on the supplied CD-ROM.
When your printer is **UP-D70**, also see the instruction manual of the printer driver software you are using.

① While the printer is receiving the image data from the computer, the following message appears:
The data is written in the memory of the printer.

```
IMAGE  TRANSFER
RGB[>>>        ]
```
Indicates the data is being transmitted.

(Continued)

Printing (Continued)

②The stored image data is printed as soon as the print command is entered from the computer or the PRINT button of the printer is pressed.

```
PRINTING
<YELLOW>  QTY  1
```

Color indication changes as the color printing proceeds:
Color printing:
Starting→ YELLOW→ MAGENTA→ CYAN → Finishing
Laminate printing:
Starting→ CYAN→ LAMI→ Finishing

③Depending on the size of image, type of ribbon, and/or resolution mode, it takes about one to two minutes for a printout to emerge from the paper outlet.
Once printing has been completed, the printer returns to standby status.

```
READY
   A4+ QTY  1
```

Notes
• Do not pull the paper out till the printer finishes printing.
• To prevent paper jamming, **do not allow more than 20 printouts on the paper cover.**

To stop receiving the data or to stop printing midway
Press the STOP button. Data reception is abandoned midway and the printer is reset to standby status. When the printing is abandoned midway, the following message appears. After the print paper remained in the printer is ejected, the printer is reset to standby status.
When the computer of Windows is used, the computer may hang up if you press the STOP button during data transmission. It is recommended to stop printing midway on the computer site.

```
PLEASE WAIT
```

To make a second copy of a printout
Execute the print menu of the computer again or press the PRINT button of the printer. The image data stored in the memory is printed again.

About memory (only UP-D70A)
The image data sent from the computer is stored in the memory of the printer.

If the printer does not print
The printer will fail to print in the following cases:
• An error message is displayed in the printer window display. Take remedies according to "Error Messages" on page 32.
• The image data stored in the memory is lost when you turn off the power. Execute the print menu again to send the data for printing.

Notes on storing your printouts
• Avoid storing the printout in a location subject to high temperatures, high humidity, excessive dust and direct sunlight.
• Do not stick tape on a printout. Also avoid leaving a plastic eraser on a printout or placing a printout in contact with materials which contain plasticizer (under a desk mat, for example).
• Do not allow alcohol or other volatile organic solvents to come into contact with the printouts.

Setting the Print Quantity

You can set a print quantity value up to 20 before or during printing.

1, 3   **2**
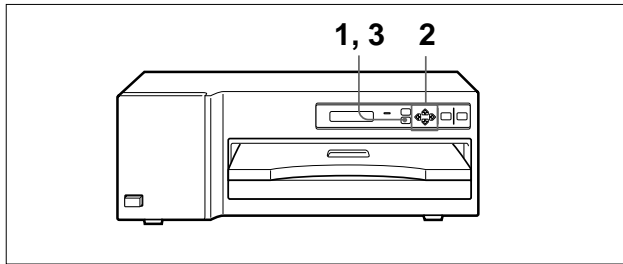
1 Press the PRINT QTY button.
The print quantity setting menu is displayed in the printer window display.

PRINT QTY: 1
   (COLOR 100)

Current setting

Number of printouts the remaining ribbon can afford.

Type of ink ribbon being loaded (COLOR, B&W, LAMI)
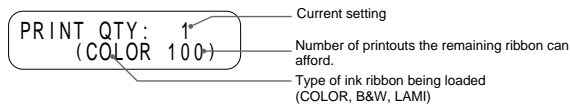
2 Set the quantity with the ⇦ or ⇨ button.
⇦ : The number increases.
⇨ : The number decreases.
When you keep the button pressed, the number changes quickly.

PRINT QTY: 12
   (COLOR 100)

Printing quantity changes.
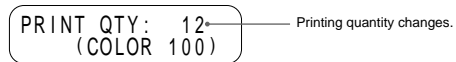
3 To exit from the print quantity setting menu, press the PRINT QTY button again.
The printer window display returns to standby status and you can print the number of copies of the renewed setting.

READY
   A4+ QTY   12

Renewed setting
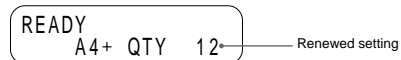
When the print paper runs out during printing
Load the print paper in the paper tray and press the PRINT button. The printer prints the remaining copies.

Notes
• When you turn off the power, the print quantity setting is reset to 1.
• You can also set the print quantity from the application software. The most recently set quantity remains effective until changed.
• The "QTY" value in the printer window display decreases each time one printout comes out to indicate the remaining copies to be printed.

Adjusting the Printouts

You can adjust the picture quality of a printout with the MENU button before printing. The most recent setting remains effective until changed.

1, 4   **2, 3**
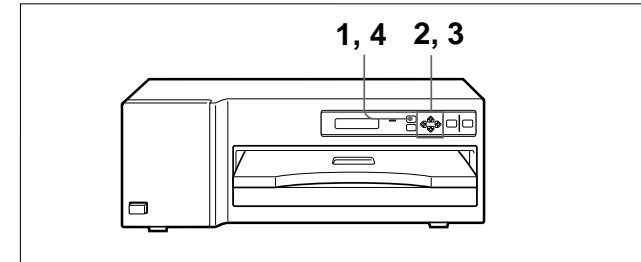
1 Press the MENU button.

2 Display the COLOR ADJUST menu by pressing the ⇧ or ⇩ button.
The first item of the printout adjust menu (for RED) appears in the printer window display. The default or preset level is shown both as a value and graphically.

RED   :   0
–––––––*–––––––

Default level (or preset level)
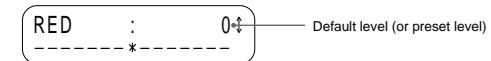
3 Perform adjustment.
① Select the item for adjustment by using the ⇧ or ⇩ button.
⇩ : Scrolls up to the previous item.
⇧ : Scrolls down to the next item.

② Adjust the level by pressing the ⇦ or ⇨ button.
You can adjust the level for RED, GREEN and BLUE of the color, DARK and LIGHT of the tone and GAMMA of the half tone between –32 to +32. The center of the graph and the value 0 is the standard level.
⇨ Increases the level.
⇦ : Decreases the level.
The sharpness can be adjusted among 4 levels: NONE /LOW/MIDDLE/ HIGH.
The LAMINATION can be adjusted among 5 kinds of the lamination types: OFF/Glossy/NonGlare/Texture/Matte.

(Continued)

Adjusting the Printouts (Contineud)

Adjustment items			Adjustment content
Color	RED		Red becomes stronger.[a]
	GREEN		Green becomes stronger.[a]
	BLUE		Blue becomes stronger.[a]
Tone	DARK		Dark tone becomes stronger.[a]
	LIGHT		Light tone becomes stronger.[a]
Sharpness	SHARPNESS		The outlines become sharper.
Half tone	GAMMA		Half tone colors become stronger.[a]
Lamination types	LAMINATON	OFF	No lamination
		Glossy	Glossy surface
		Nonglare	Nonglare surface
		Texture	Silk pattern surface
		Matte	Foggy pattern surface

a) When you press ⇨

Example: To set the level of DARK to 12
Press the ⇨ button Twelfth.

DARK : 12⇕ ——— Level value changes.
−−−−−−−+−−−*−−− ——— Moves to the level-12 position.
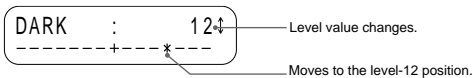
4 To exit from the printout adjust menu, press the MENU button again.
The printer returns to standby status.

READY
A4+ QTY 1
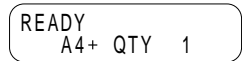
Notes

• You can also adjust the printout picture quality from the application software.
The most recently set values are effective until changed.
• The next printout is printed with the newly set values. You cannot adjust the
color during printing.
• If you do not press any button for approximately 15 seconds after pressing the
MENU button , the printer is automatically reset to standby status.

Adjusting the Gray Balance

The ink ribbon and the paper are contained in one same package as a pair. The gray
balance may differ depending on each pair. It is recommended that you adjust the
gray balance each time you reload the ink ribbon and paper.
The gray balance was set to No.0 at the factory. The setting of the gray balance
remains effective until reset - even if you turn the power off.

Before adjusting the gray balance

Perform the following:
• Set the adjusted values for printouts, except SHARPNESS and LAMINATION,
to zero (0). (See page 23.)
If the printout adjustment was performed at the computer site, then also set them
to 0.
• Set the gray balance to pattern No.0, if you adjusted the gray balance previously.
(See explanation described below.)

5, 8   6, 7
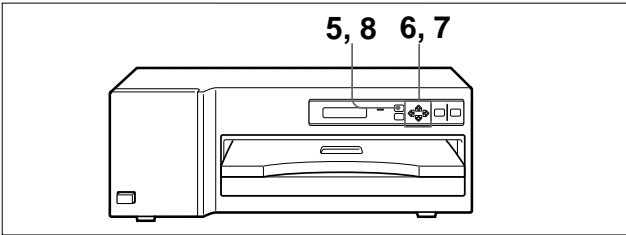
1 Open the GrayADJ 1 file in the Image folder on the supplied CD-ROM and
make a printout of the gray adjustment patterns from No.0 to No.36.

2 Select the printout pattern No. which had the best gray adjustment among the
patterns printed.

3 If you cannot find a proper one, open the GrayADJ 2 file in the Image folder
and make a printout of the gray adjustment patterns from No.37 to No.72.

4 Select the printout pattern No. which had the best gray adjustment among the
patterns printed.

5 Press the MENU button.

6 Display the GRAY ADJUST menu by pressing the ⇧ or ⇩ button.
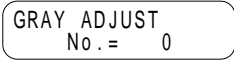
GRAY ADJUST
No.= 0

Adjusting the Gray Balance (Continued)

7 Display the pattern No. selected in step 2 or step 4 by pressing the ⇦ or ⇨ button.
Example: When you decided that the printout of the No.18 gray pattern was the best.

```
GRAY ADJUST
   No.=  18
```

8 To exit from the gray balance adjustment menu, press the MENU button again. The printer returns to standby status.

```
READY
  A4+ QTY  1
```

The gray balance has been adjusted.
After finishing the gray balance adjustment, make a printout of the gray balance adjustment patterns. If the gray balance of the printout of No.0 gray pattern is the best, the gray balance has been corrected to the gray balance selected in step 7.

Notes
• The next printout is printed with the newly set values. You cannot adjust the color during printing.
• If you do not press any button for approximately 15 seconds after pressing the MENU button , the printer is automatically reset to standby status.

Others

Precautions

Safety

• Operate the printer on 120 V AC, 50/60 Hz power supply only.
• Be careful not to damage the power cable by placing or dropping heavy objects on it; it is dangerous to use the unit with a damaged power cable.
• If you do not intend to use the unit for a long time, disconnect the power cable.
• Unplug the power cable by grasping the plug, not the cable itself.
• Do not disassemble the unit.
• Do not remove the cover. There is a danger of electric shock from the internal parts.
• Be careful not to spill water or other liquids on the unit, or to allow combustible or metallic material to enter the cabinet. If used with foreign matter in the cabinet, the unit is liable to fail, or present a risk of fire or electric shock.
• If the unit malfunctions or if a foreign body falls into the cabinet, disconnect the power immediately and consult with your dealer.

Installation

• Avoid placing the unit in a location subject to:
  – mechanical vibration
  – high humidity
  – excessive dust
  – direct or excessive sunlight
  – extremely high or low temperatures
• Ventilation holes are provided to prevent the unit from overheating. Be careful not to obstruct them with other units or by covering the unit with a cloth etc.

On condensation

• If the printer is subjected to wide and sudden changes in temperature, such as when it is moved from a cold room to a warm room or when it is left in a room with a heater that tends to produce large amounts of moisture, condensation may form inside the printer. In such cases the printer will probably not work properly, and may even develop a fault if you persist in using it. If moisture condensation forms, turn off the power and leave the printer to stand for at least one hour.
• If the printing pack is subjected to wide and sudden changes in temperature, condensation may form on the ink ribbon or paper inside. This will cause the printer to malfunction. Also if the printing pack is used in this state, spots are likely to appear on the printout.
• To store a half-used printing pack, replace it in its original packing and reseal the package. If possible, keep the sealed printing pack in a cool, dark location. To subsequently use the printing pack, place it, in its sealed package, in a warm room for several hours. Doing so prevents condensation from forming when the printing pack is removed from its package.

Precautions (Continued)

On Transportation

Do not transport the printer with the supplied accessories. Doing so may cause malfunction.

1 Remove the ink ribbon cassette and the paper tray.

2 Lock the thermal head.
① Turn on the power of the printer.
② Press the STOP, ⇦ and ⇨ buttons together.
③ Turn off the power of the printer.
The thermal head is locked.

To unlock the thermal head
Turn on the power of the printer again. The thermal head moves and you can load the ink ribbon cassette again.

Cleaning

Note
Be sure to turn off the power of the printer before starting cleaning.

Cleaning the cabinet

Clean the cabinet, panel and controls with a soft dry cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which may damage the finish.

Cleaning the filter

Ventilation holes are provided to prevent the unit from overheating on the left side and the rear of the printer.
When the message "CLEAN FAN FILTER" appears on the printer widow display, the filter of the ventilation holes on the left side has become dirty.
To clean the filter, proceed as follows.

1 Remove the fan cover, then filter.
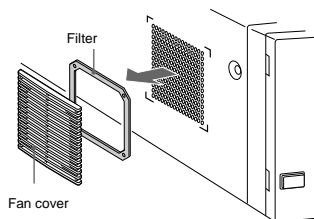
Filter

Fan cover

2 Clean the fan using the vacuum cleaner and the like.

Notes
• Be careful that the filter will be caught in the cleaner.
• Do not rub the net of the fan strongly.

3 Reset the filter and the fan cover on the side panel as they were.
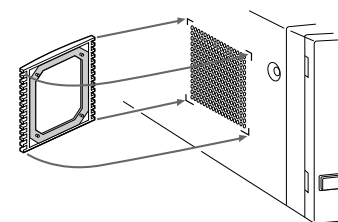
Ink Ribbon and Print Paper

You need print paper and ink ribbon cassette for printing. ("Ink ribbon cassette" stands for the supplied ink ribbon holder loaded with ink ribbon.) Use the ink ribbon and print paper contained in the same package. If the printer detects an incompatible combination, an error message appears in the printer window display and you cannot make printouts.

Color Printing Pack UPC-8811

Contains color ink ribbon and paper.
Color ink ribbon: 1 roll
Letter size paper 100 sheets

Color Printing Pack UPC-8817

Contains color ink ribbon and paper.
Color ink ribbon: 1 roll
A4+ size paper 100 sheets (The size is little larger than A-4 size paper. This paper allows you to make the printout of the A-4 size.)

B/W Printing Pack UPC-8821

Contains an ink ribbon and paper.
Black and white ink ribbon: 1 roll
Letter size paper 100 sheets

Self-laminating Color Printing Pack UPC-8841

Contains an ink ribbon and paper for automatic laminate coating.
Color ink ribbon 1 roll
Letter size paper 70 sheets

Self-laminating Color Printing Pack UPC-741

Contains an ink ribbon and paper for automatic laminate coating.
Color ink ribbon 1 roll
Letter size paper 72 sheets

Self-laminating Color Printing Pack UPC-747

Contains an ink ribbon and paper for automatic laminate coating.
Color ink ribbon 1 roll
A4+ size paper 72 sheets (The size is little larger than A-4 size paper. This paper allows you to make the printout of the A-4 size.)

Notes

• **Use only ink ribbon and print paper for this printer.** If you use a different type, the printer may not print properly or malfunction.
• Ink ribbon and print paper are not reusable. After you finish with them, replace them with new ones.

Specifications

Power requirements
　　　120 V AC, 50/60Hz
Power consumption
　　　2.4 A at 100 to 120 V AC
　　　Maximum 270 W
Operating temperatures
　　　5˚C to 35˚C
Dimensions　Approx. 493.8 × 176 × 468.8 mm (w/h/d)
　　　(19 ½ × 7 × 18 ½ inches)
Mass　　　Approx. 19 kg. (42 lb)
Printing system
　　　Dye transfer sublimation thermal printing
Thermal head　2,560 elements, 11.8 dot/mm (300dpi)
Gradations　256 levels each for yellow, magenta and cyan
Picture size　Maximum
　　　Letter size: 254.0 × 203.2 mm (w/h) (10 × 8 inches)
　　　A4+ size: 297.0 × 215.9 mm (w/h) (11 ¾ × 8 ½ inches)
Picture elements
　　　Maximum
　　　Letter size: 3,000 × 2,400 dots (w/h)
　　　A4+ size: 3,508 × 2,550 dots (w/h)
Printing time　Approx. 85 seconds per page for color printing (300 dpi)
　　　Approx. 115 seconds per page for laminate printing (300 dpi)
Picture memory
　　　30 M bytes (4,096 × 2,560 × 3 × 8 bits)
Interface (only UP-D70A)
　　　SCSI × 2, (Amphenole 50-pin connector)
　　　PARALLEL DATA IN × 1, (Amphenole 36-pin connector)

Accessories supplied
　　　Ink ribbon holder (1)
　　　Paper tray (1)
　　　Paper cover (1)
　　　Fan cover (1)
　　　Bottom cover (1)
　　　AC power cord (1)
　　　Operating Instructions (1)
　　　Warranty Card (1)
　　　Registration card (1) (only UP-D70A)
　　　CD-ROM (1)
　　　SOFTWARE LICENSE AGREEMENT (1) (only UP-D70A)
Optional accessories
　　　Color Printing Pack UPC-8811
　　　Color Printing Pack UPC-8817
　　　B/W Printing Pack UPC-8821
　　　Self-laminating Color Printing Pack UPC-8841
　　　Self-laminating Color Printing Pack UPC-741
　　　Self-laminating Color Printing Pack UPC-747

Design and specifications are subject to change without notice.

Troubleshooting

If a problem appears, check the following trouble shooting guide first and perform whatever action is necessary to solve the problem. If the problem persists, turn off the printer and consult with your Sony dealer.

Symptom	Possible causes and remedies
Nothing appears in the printer window display.	The POWER switch of the printer is not set to ON.
	→ Set the POWER switch of the printer to ON. If the power switch is set to ON, once set it to OFF, then to ON again. (page 6)
	Connections may not be correct.
	→ Make connections correctly. (page 12)
The printer does not print.	An error message appears on the printer window display.
	→ Take remedies according to "Error Messages". (page 32)
	An ink ribbon cassette and print paper are not loaded.
	→ Load an ink ribbon cassette and print paper. (pages 14 and 17)

Error Messages

If a problem occurs, the ALARM indicator lights and an error message stating the problem appears in the printer window display. Note the message and perform whatever action is necessary to solve the problem.

Error messages	Possible causes and remedies
IMAGE TOO LARGE	The size of the printout is set beyond the printing limits.
	→ Adjust the printing size from the computer.
END OF RIBBON	The ink ribbon has been completely used.
	→ Replace with the new ink ribbon. (Ink ribbons cannot be reused.) (page 14)
HEAD IN COOLING	The thermal head has overheated.
	→ Leave the printer until the head cools down and this message disappears.
HEAD IN HEATING	The thermal head is warming up.
	→ Leave the printer until the head has warmed up and this message disappears.
CLEAN FAN FILTER	The filter has become dirty.
	→ Remove the fan cover on the side panel of the printer and the filter. Clean the filter. (page 28)
NO RIBBON	Ink ribbon cassette is not fitted properly.
	→ Ensure that the ink ribbon is loaded properly in the ink ribbon holder, and the ink ribbon cassette in the printer. (page 14)
NO IMAGE DATA	No image data is stored in the printer memory.
	→ Transfer the image data from your computer. (page 19)
NO PAPER	The print paper has run out.
	→ Load the print paper into the paper tray. (page 17)
PLEASE WAIT	When you press the STOP button or turn off the power while printing, or the printer detects an invalid combination of the print paper and ink ribbon and automatically stops printing, this message appears.
	→ Wait for the printer to eject the paper.

Error messages	Possible causes and remedies
CHECK PAPER AND PRESS [⇔]	The print paper may be jammed.
	→ Remove jammed paper from the printer, if there is any. Ensure that no paper jammed, then press ⇔ button. (page 34)
REMOVE PAPER AND PRESS [⇔]	The print paper has jammed.
	→ Remove jammed paper from the printer and press ⇔ button. (page 34)
RESERVED	The printer is reserved. All the buttons other than the STOP button are deactivated.
	→ To activate the buttons, release the reservation of the printer from your computer.
RIBBON ERROR	The ink ribbon develops some trouble.
	→ Ensure that the ink ribbon does not tear and the ink ribbon cassette and paper tray are loaded properly. (pages 15 and 16)
RIBBON & PAPER MISMATCH	The ink ribbon and print paper are not compatible.
	→ Use a valid combination of print paper and ink ribbon. (page 30)
MECHA TROUBLE	The mechanical trouble occurs in the printer.
	→ Turn off the power once and then turn it on. If the message will still remain in the printer window display, turn off the power immediately and contact your Sony dealer.

Troubleshooting (Continued)

If the Paper Jams

If the paper jams, printing stops and the error message stating "CHECK PAPER AND PRESS [⇨]" or "REMOVE PAPER AND PRESS [⇨]" appears on the printer window display. Follow the steps below to remove the jammed paper.

1 Remove the paper cover.
If any printouts have been ejected on the paper cover, remove them first before removing the paper cover.
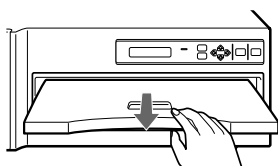
2 Check where any paper is jammed inside the printer.
If you find a jammed sheet around the paper outlet, slowly pull it out straightly to the right.
If you find a jammed sheet on the way inside the printer, slowly pull it out straightly to the right. If the tray cover is in the way, remove it.
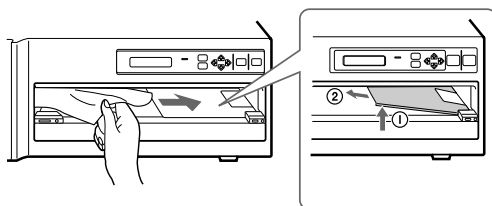
If the tray cover is in the way, remove it by lifting it up ①, and then pulling it out to the direction of arrow ②.

3 Push PUSH on the paper tray.
The paper tray pops out.
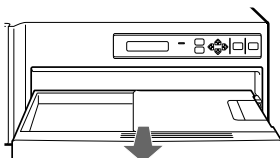
4 Remove the bottom cover.
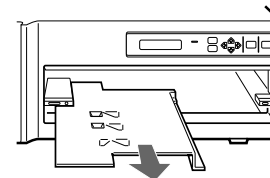
5 Check whether any paper is found on the bottom of the printer. If you find one, remove it.
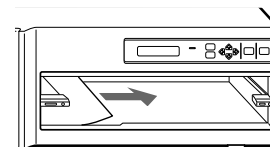
6 Ensure that the print paper is properly loaded.
Discard the sheets removed in steps 2 and 5

7 Re-insert he removed bottom cover, paper tray, tray cover and/or paper cover into the printer.
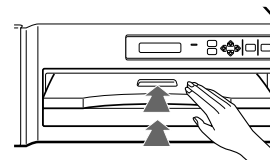
8 Press the ⇨ button.
The error message disappears and the printer returns to the standby status.

```
READY
   A4   QTY   1
```

Index

SECTION 2
SERVISE INFORMATION

2-1. PROCESS ORDER WHEN REPLACING EACH PART

1. When Replacing Thermal Head

(1) Replacing order
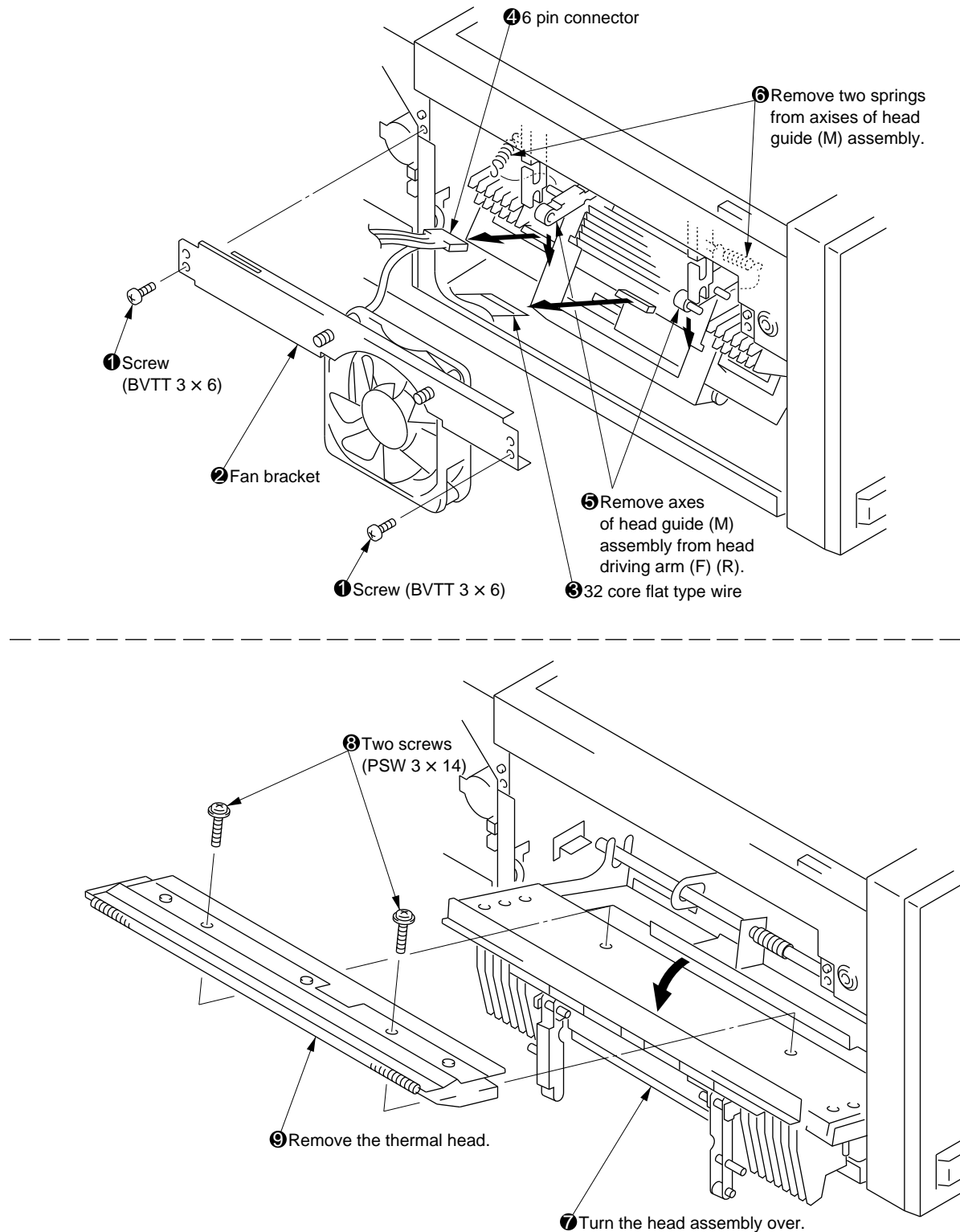
(2) Resistance value data ROM replacement

   This unit has a resistance value data ROM against the each thermal head. After thermal head replacement, IC209 on the SY-270 board should be changed to new ROM attached.

(3) TOTAL PRINT Reset

   According to page 5-12, TOTAL PRINT quantity should be reset.

(4) Printing check

   After entering in service mode, test pattern printing is performed. Ensure the following items.

   • Is density of each step the most suitable?

     If density is not suitable, after entering the ADJUST mode, head voltage should be finely adjusted.

   • Is there unevenness density toward the thermal head element?

     Resistance value data ROM should be inserted. Attachment of the thermal head should be checked.

2. When Replacing EEPROM or MEC-11 Board

When replacing EEPROM or MEC-11 board (that has EEPROM), content of EEPROM is indefinite value. Each kind establishment value is needed to return at initial value. Adjustments should be needed.

(1) EEPROM reset

   After entering in service mode, EEPROM should be reset.

(2) Adjustments

   After entering in ADJUST mode, setting of letter or A4 size, setting of Std or lami, luminance quantity adjustment of three kinds of sensors should be performed.

(3) Test pattern printing

(4) Thermal head fine adjustment

   Density of paper of item (3) should be checked, if necessary, thermal head voltage fine adjustment should be performed.

3. When Replacing Bar Code, Ribbon Code and OHP Sensors

After entering ADJUST mode, luminance quantity adjustment for replaced sensor should be performed.

2-2. LOCATION OF MAIN PARTS

SE-503

Switching regulator

IF-610 (UP-D70A)

Thermal head

MEM-96 (UP-D70A)

FMY-15 (UP-D70A)

SE-507

SE-497

SE-498

SE-504

SY-270

SE-506

SU-51

SU-48

SU-50

SE-505

MEC-11

SE-502

SU-49

Liquid crystal indication panel unit
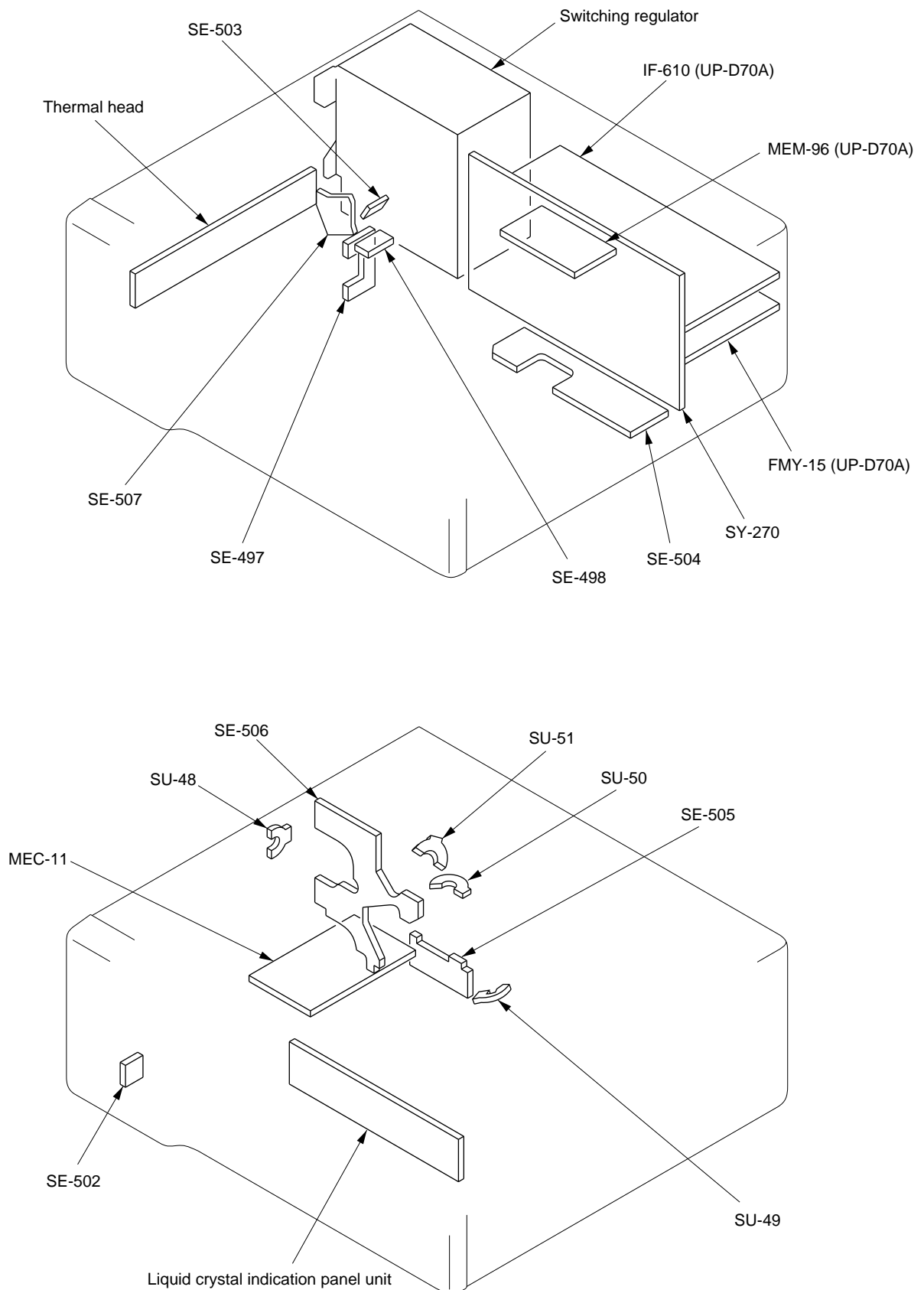
2-3. DISASSEMBLY

1. Removal of the Accessories

❻Fan cover

❼Fan filter

❷Ribbon cartridge

❶Open the ribbon door.

❸Paper delivery tray

❹Paper supply tray

❺Bottom cover

2. Removal of the Front Panel Assembly

❷Top cover

❶Four screws (M3)
fixing case

❼Two screws
(BVTT 3 × 6)

❹Open the ribbon door.

❺Two screws
(BVTT 3 × 20)

❸Connector
(CN6-22 pin)

❽Front panel assembly

❻Two screws (BVTT 3 × 6)

2-4

UP-D70/D70A (UC,CE)
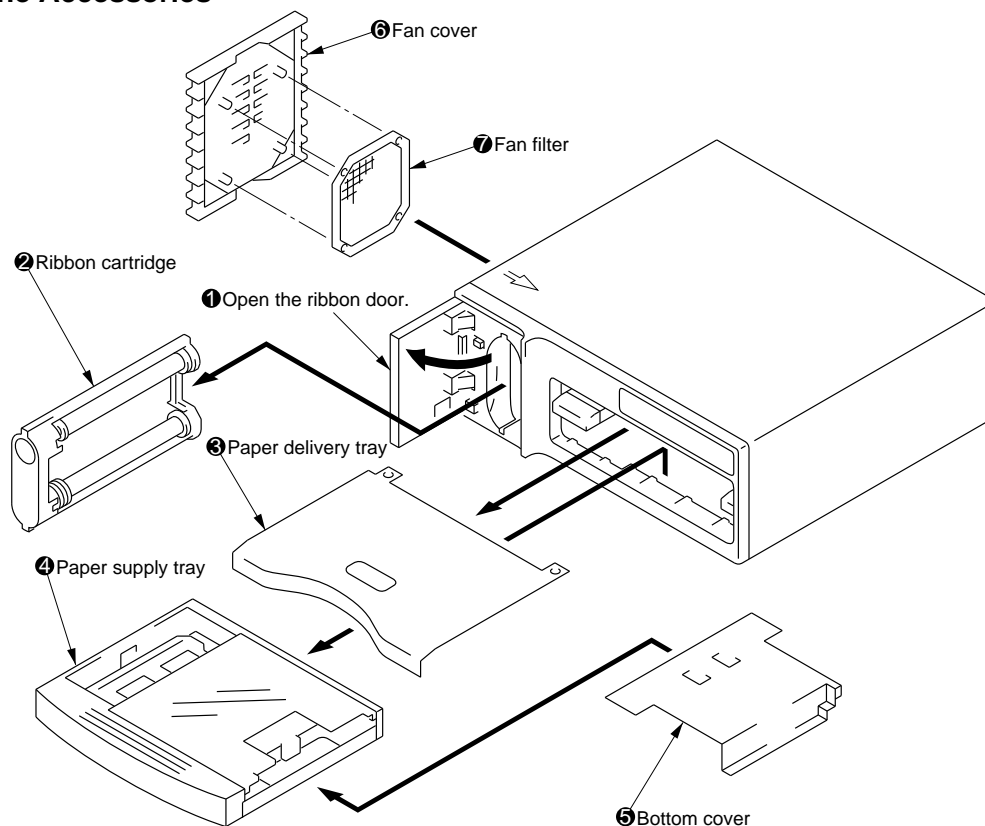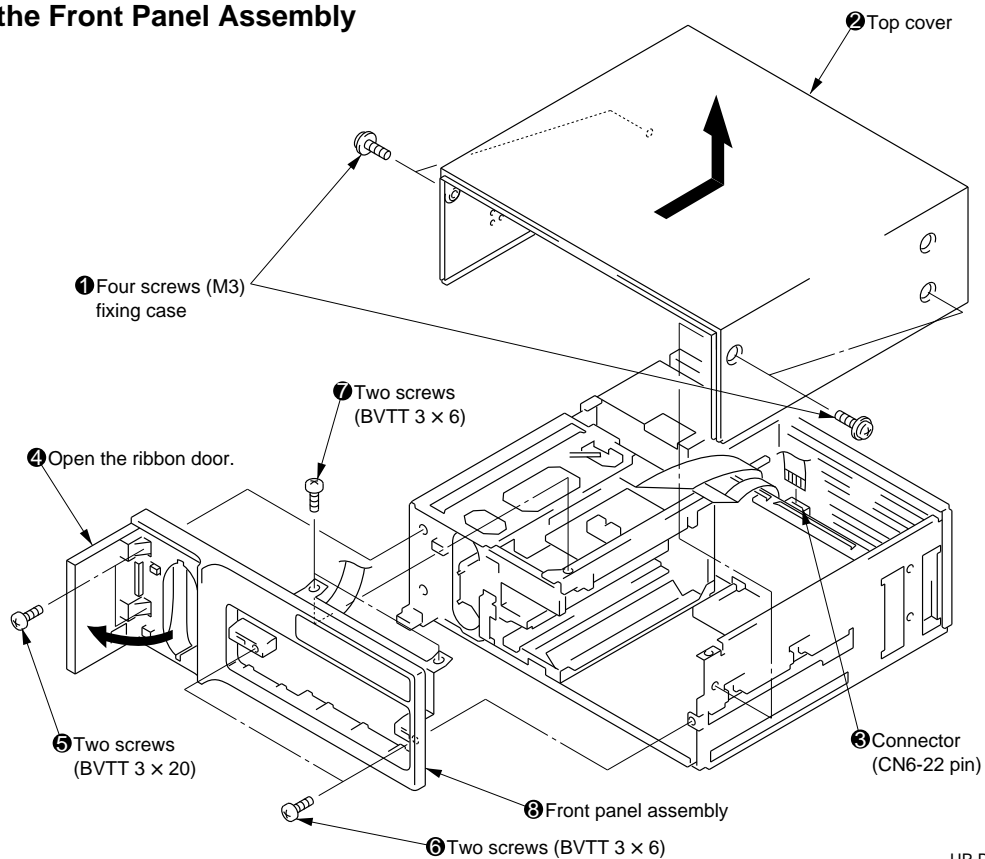
3. Removal of the Mechanical Main Unit

❺Connector
(CN410-9 pin)

❻Two screws (BVTT 3 × 6)

❹Connector (CN4-6 pin)

❶Screw (BVTT 3 × 6)

❷Paper delivery slope

❸Three connectors
(CN4-24 pin, CN5-24 pin, CN7-32 pin)
Note: The 32 pin connector should be diconnected and connected visually.

❽Mechanical main unit

❼Three screws
(BVTT 3 × 6)
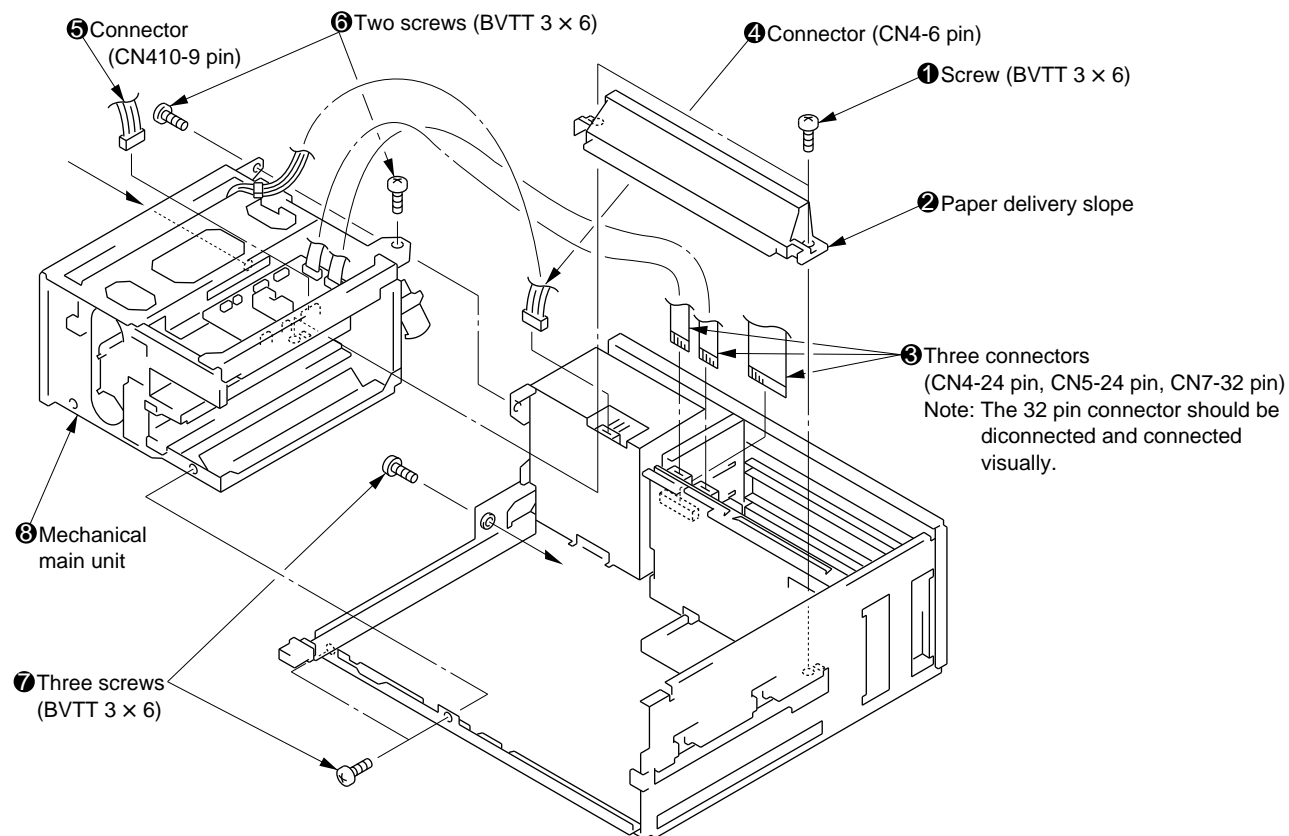
4. Removal of the Rear Panel

❻Rear panel

❺Four screws
(BVTT 3 × 6)

❹Two screws
(BVTT 3 × 6)

❷Blind plate

❸PS blind plate

❶Eight screws
(BVTT 3 × 6)
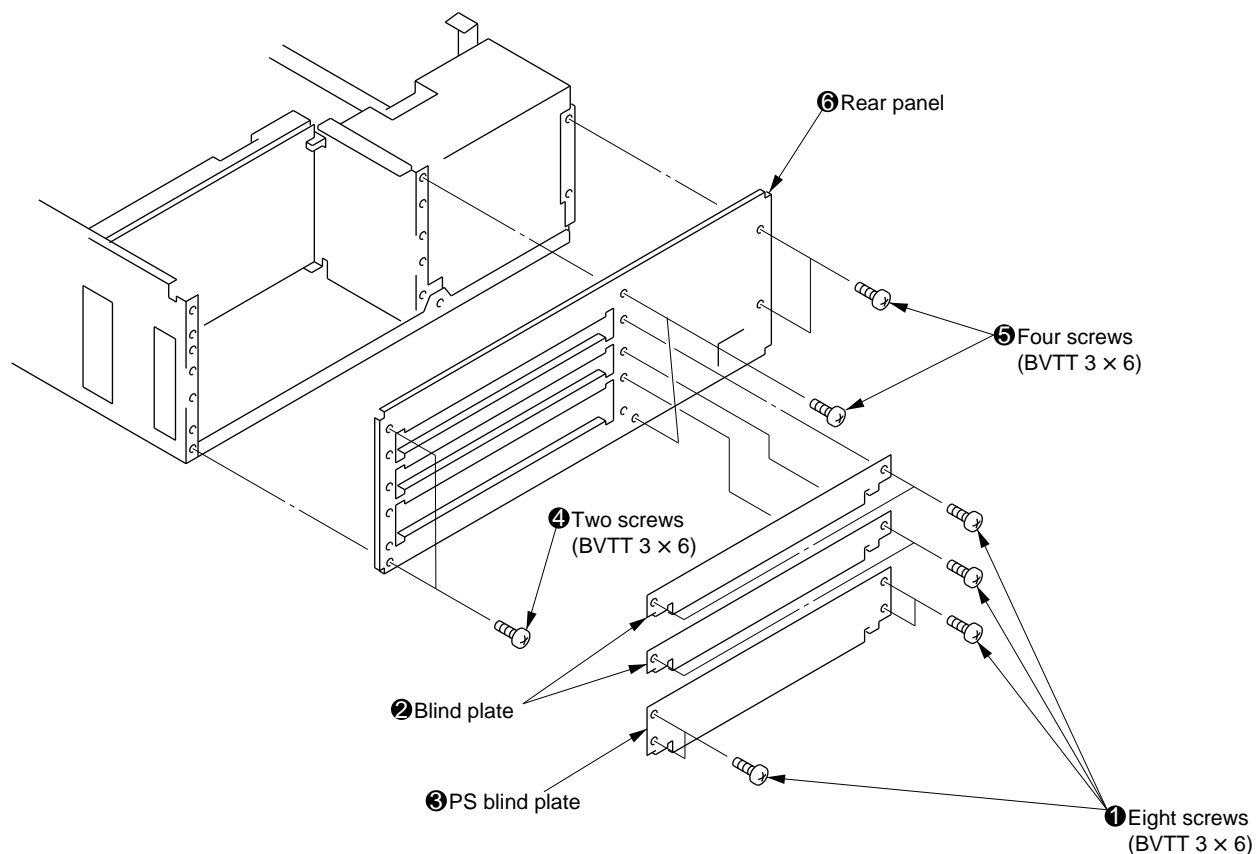
5. Removal of the Switching Regulator

❸ Remove the switching regulator from two hooks as indicated by arrow Ⓐ.

❶ Connector (CN3-10 pin)

Ⓐ

Note: Remove the rod stopper with care.

Hooks

❹ Power load

❷ Screw (BVTT 3 × 6)
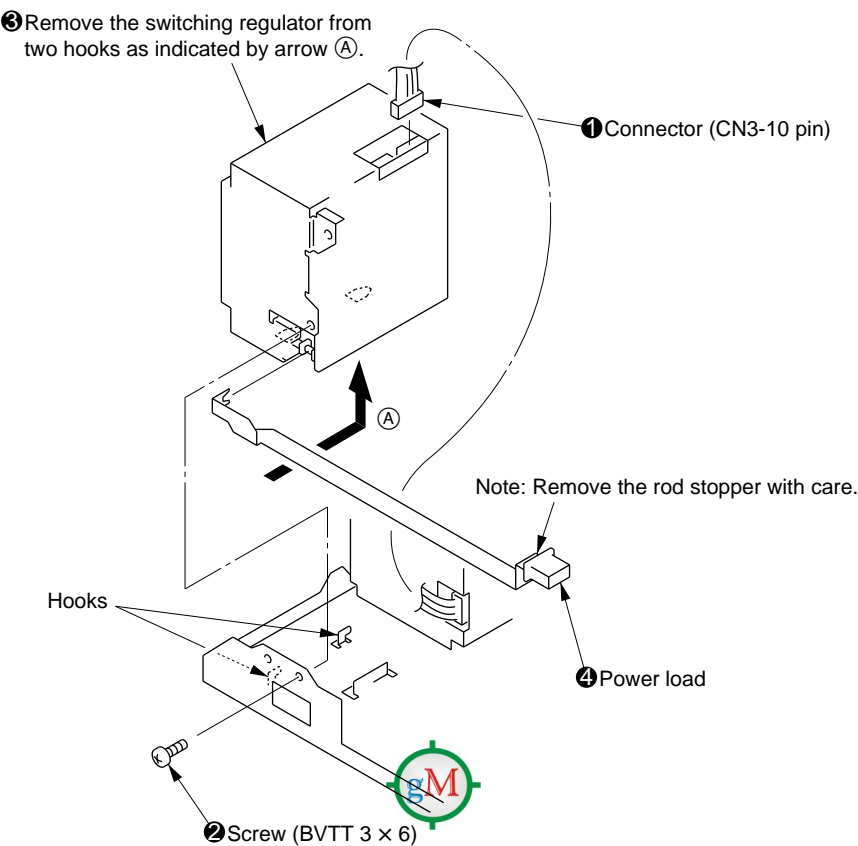
6. Removal of the Partition Assembly

❶ Screw (BVTT 3 × 6)

Ⓐ

❸ Remove the partition assembly from two hooks as indicated by arrow Ⓐ.

Hooks

❷ Two screws
(BVTT 3 × 6)

7. Removal of the Fan

❶Connector (CN703-2 pin)

❹Two screws (BVTT 3 × 6)

❸Fan bracket

❺Fan

❷Two screws (BVTT 3 × 6)
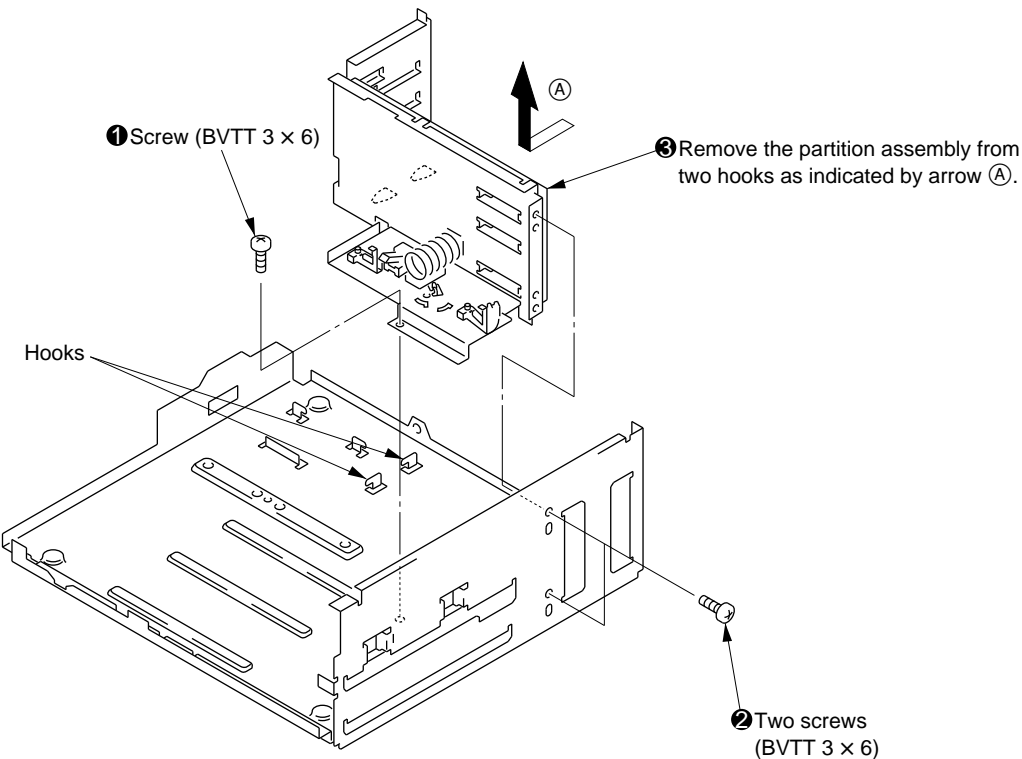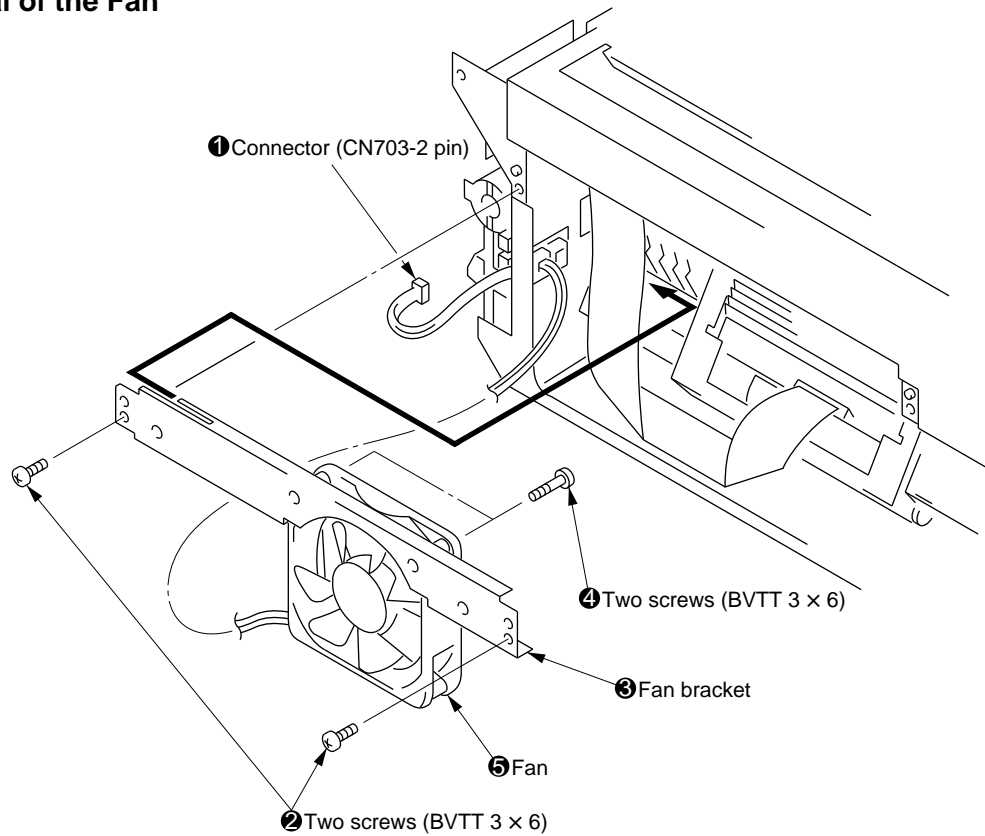
8. Removal of the MEC-11 Board, Top Plate and Corner (T)

❺Seven screws (BVTT 3 × 6)   ❼Four screws (BVTT 3 × 6)

❷Two screws (BVTT 3 × 6)

❸MEC-11 board

❹Connector (Thermal head)

❻Top plate

❽Corner (T)

CN406 15P	CN403 6P
CN404 8P	
CN409 3P	CN408 3P
CN407 5P	CN405 11P

❶Seven connectors
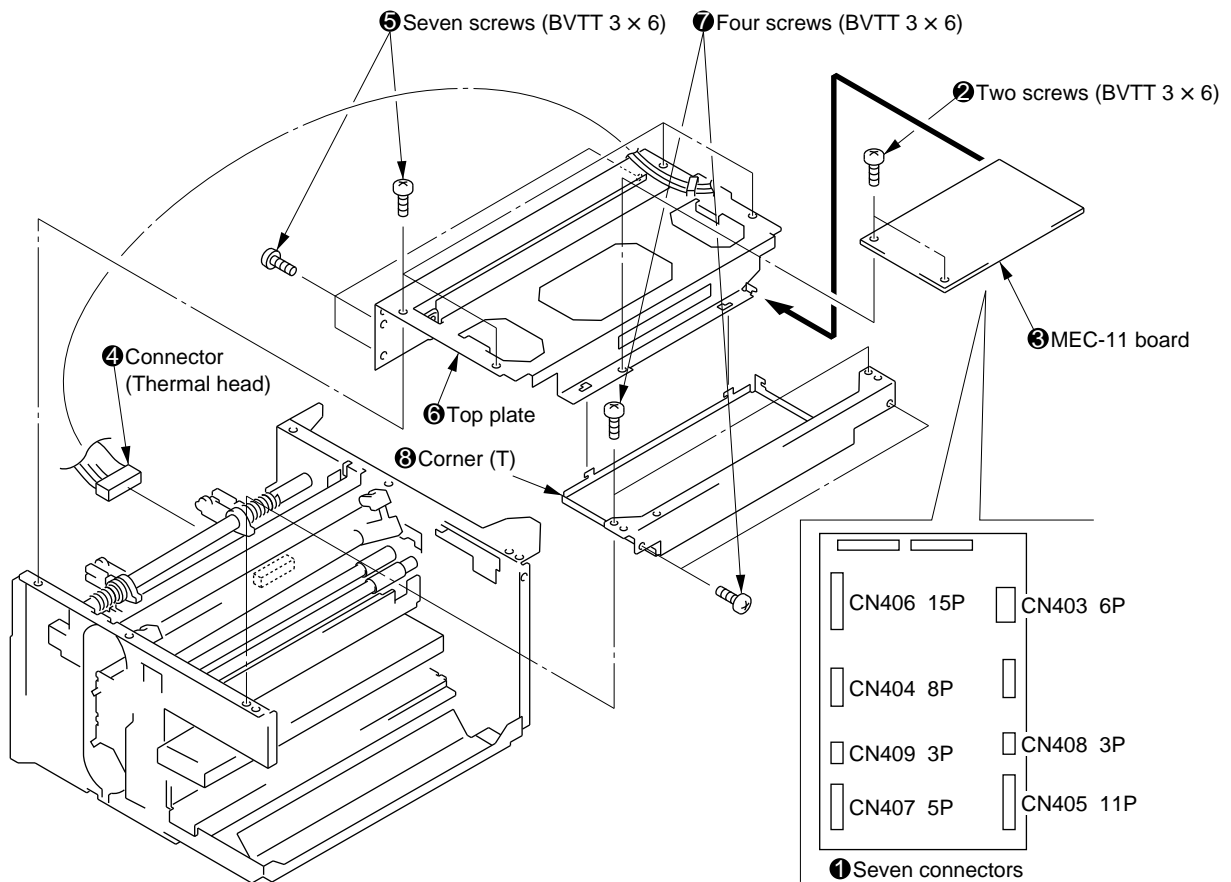
9. Removal of the Stepping Motor
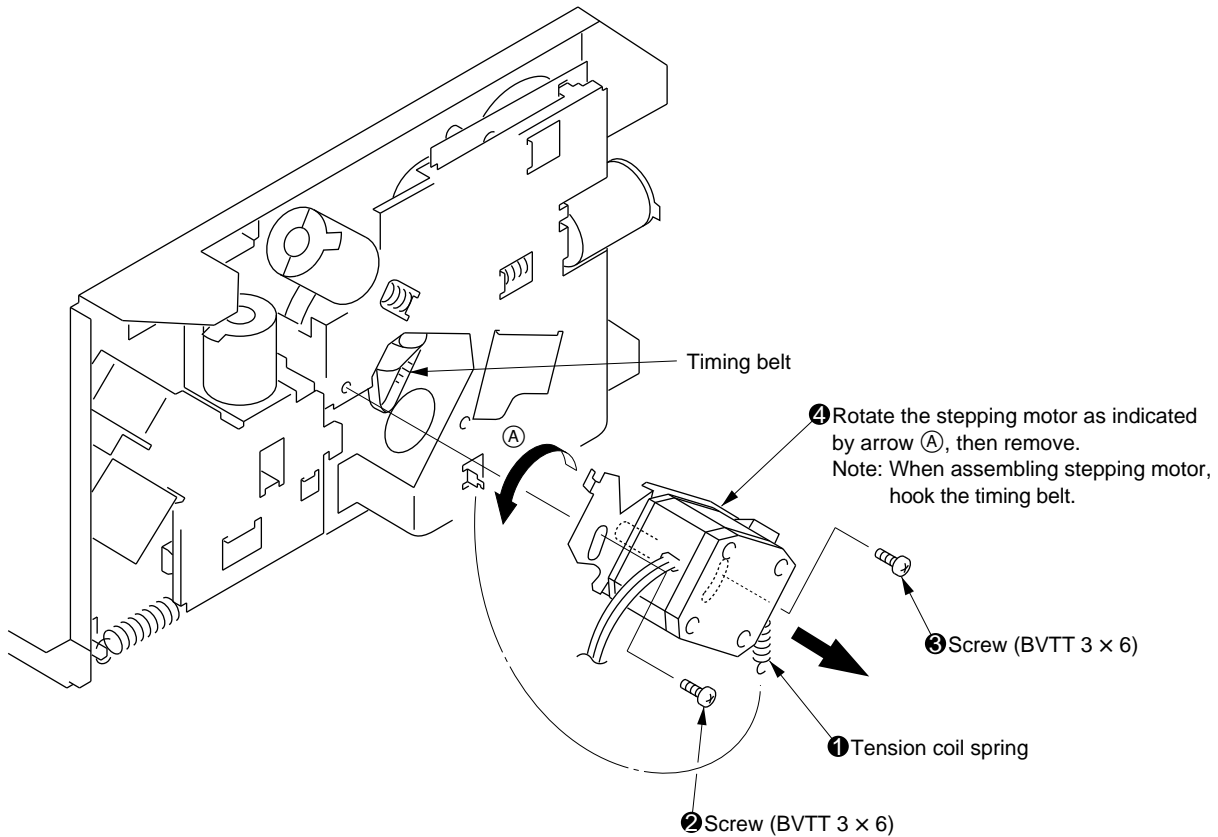
Timing belt

❹ Rotate the stepping motor as indicated by arrow Ⓐ, then remove.
Note: When assembling stepping motor, hook the timing belt.

Ⓐ

❸ Screw (BVTT 3 × 6)

❶ Tension coil spring

❷ Screw (BVTT 3 × 6)

10. Removal of the DC Motor Assembly (Motor Bracket (K) Assembly)

❸ Motor bracket (K) assembly

❺ DC motor assembly

❻ Worm assembly

❶ Screw (BVTT 3 × 6)

❼ Worm shaft

❹ Two screws (BVTT 3 × 5)

❷ Two screws (BVTT 3 × 6)

11. Removal of the DC Motor Assembly (Motor Bracket (T) Assembly)

❸Motor bracket (T) assembly

❶Screw (PS 3 × 5)

❺DC motor assembly

❻Worm assembly

❼Worm shaft

❹Two screws (PS 3 × 5)

❷Three screws (BVTT 3 × 6)
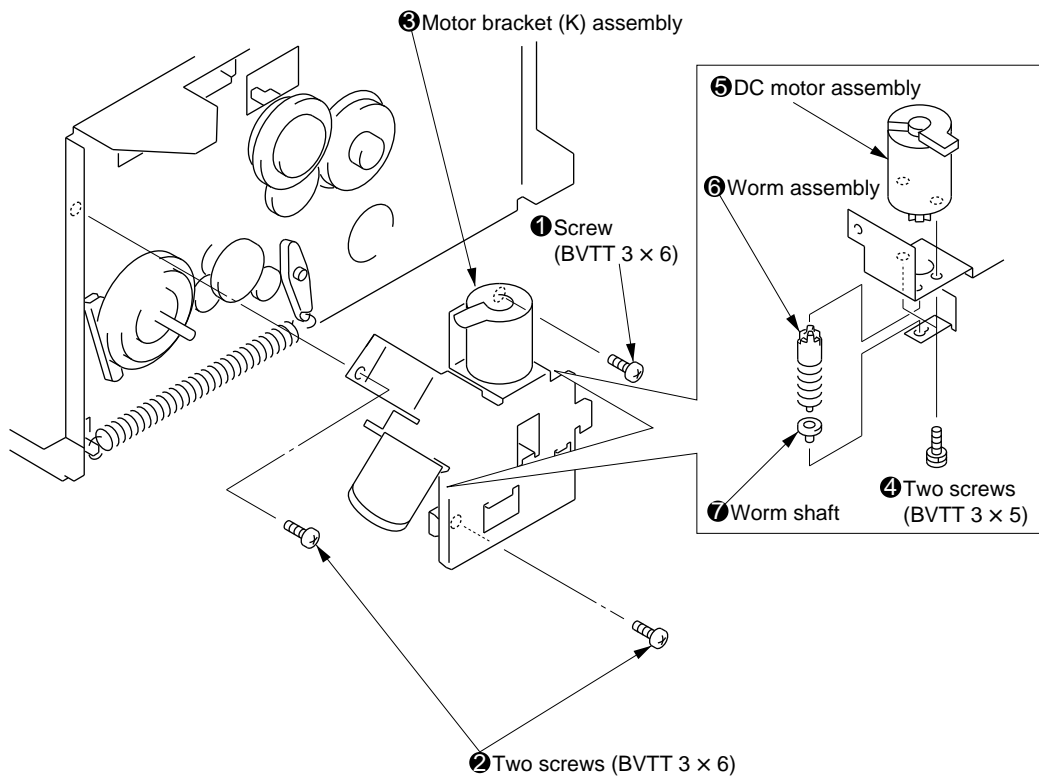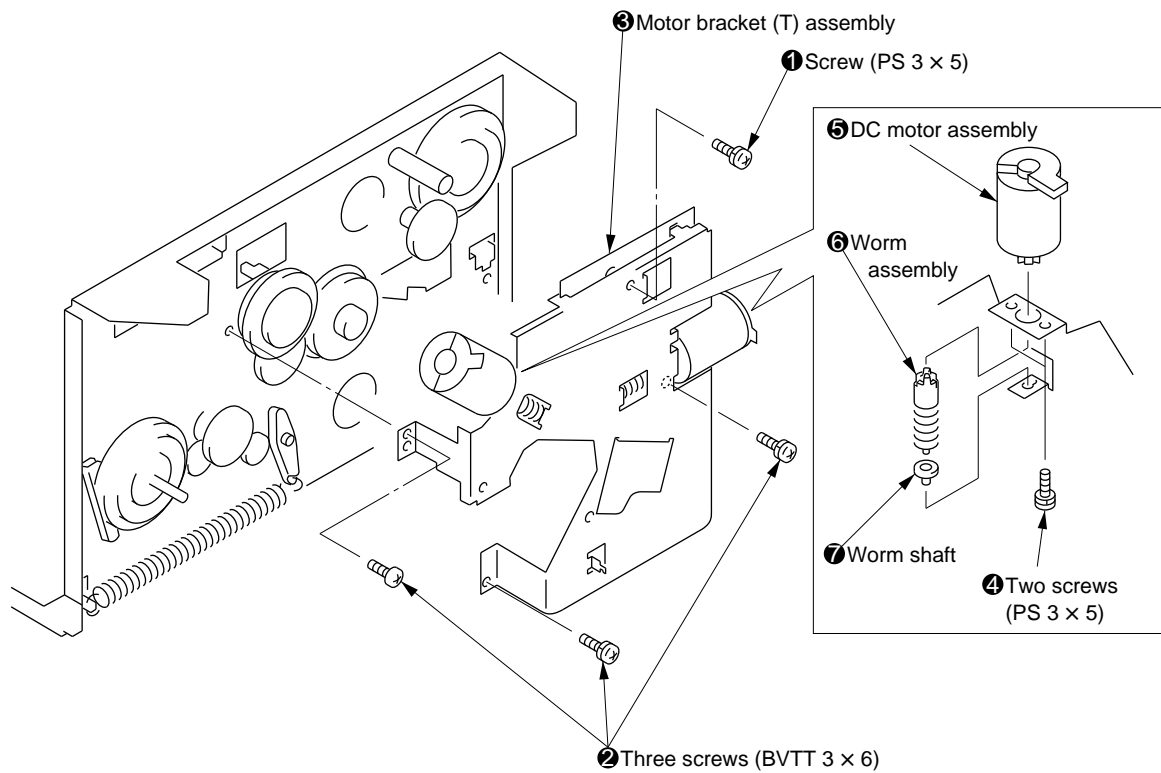
12. Removal of the Head Drive Shaft Assembly

❹Capstan drive cam, parallel pin, bearing (L)

❻Head drive shaft assembly

❺Tension coil spring

❶Screw (BVTT 3 × 6), code drive assembly

❸Lock washer, worm wheel

❷Bearing (L)

13. Removal of IF-610 and FMY-15 Boards (UP-D70A)

❷ IF-610 board

❸ FMY-15 board

❶ Four screws (B 3 × 6)
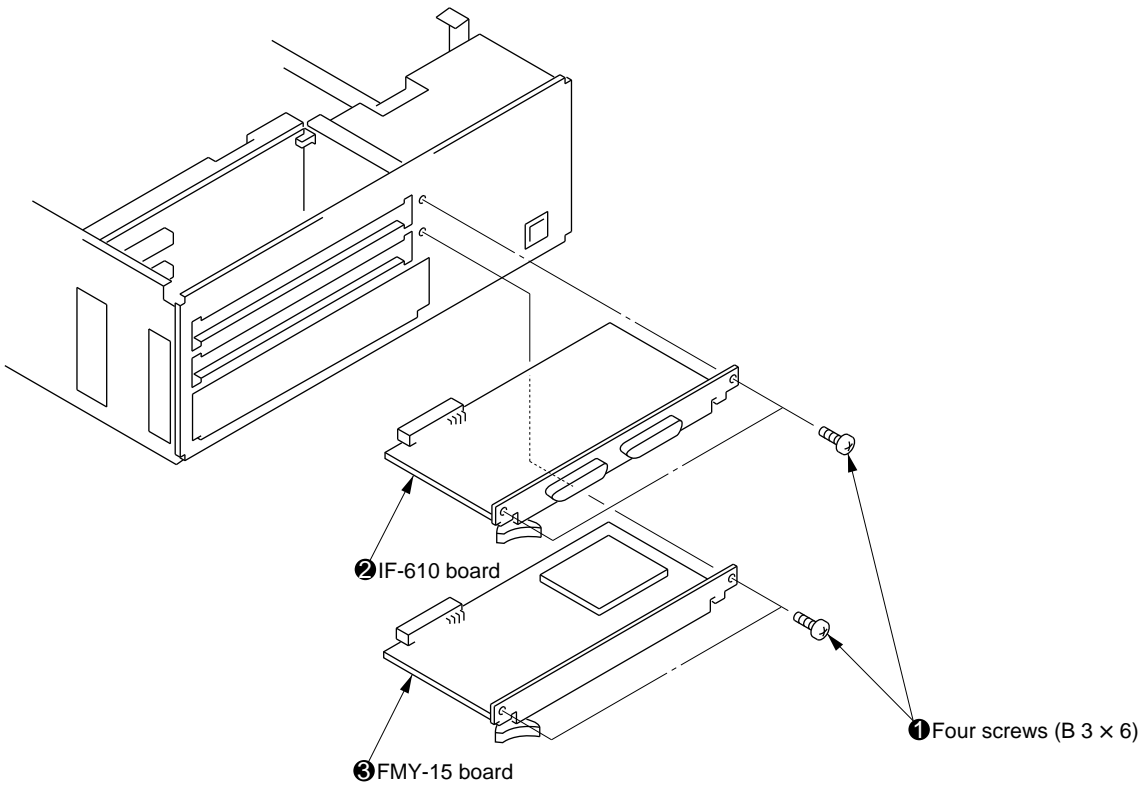
2-4. ASSEMBLING METHOD OF STEPPING MOTOR

Note: When assembling stepping motor, be sure to perform following procedures.

If not, there may be occured
$\left\{ \begin{array}{l} \text{unevenness vertical color in the print.} \\ \text{vertical line in the print.} \\ \text{that printing is stopped during yellow printing.} \end{array} \right.$

1. Hang the timing belt to capstan pulley.
2. Hang the pulley of stepping motor to the belt, and while the axis of mechanism deck matches to the hole (Peripheral is up) of motor bracket (P), hang the claw of motor bracket to the mechanism deck. (Turn clockwise)
   When the claw is not hanged, turn the paper delivery roller.
3. Hang the tension spring to mechanism deck.
4. Make sure that the belt is operated by turning paper delivery roller.
   If not, repeat Items 2 and 3.
5. Attach the stepping motor by fastening two screws +BVTT 3 × 6 in alphabetical order.
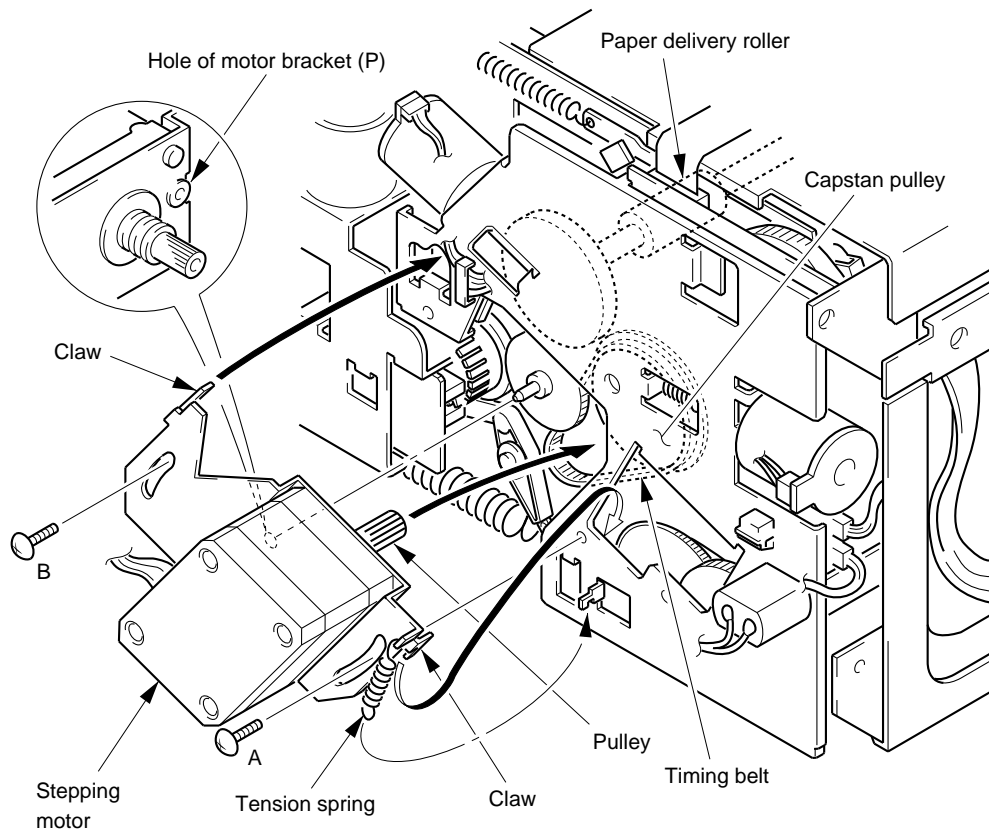
SECTION 3
MECHANICAL OPERATION

3-1. MOTOR

motor name	main function
1. Capstan drive motor (stepping motor)	• Drive of capstan roller • Drive of paper delivery roller

2. Head drive motor (DC motor)	• UP/DOWN of head
	  1) Home position
	  2) Ribbon forward & paper forward position
	  3) Printing position
	• Drive of pinch roller
	  1) Pressure
	  2) Release
	• Drive of paper delivery pinch roller
	  1) Pressure
	  2) Release

3. Ribbon take-up motor (DC motor)	• Drive of ribbon rewind reel (take-up)
4. Ribbon supply motor (DC motor)	• Drive of ribbon rewind reel (Supply)
5. Paper feed motor (DC motor)	• Drive of paper feed roller • Drive of pick-up roller • Drive of bar code detection gear

6. Paper feed lever motor (DC motor)	• Drive of paper feed lever
	  1) Home position
	  2) Printing position
	  3) Paper feed position
	• Control of bar code detection
	  1) Bar code detection possible
	  2) Bar code detection impossible
	• Drive of separation roller
	  1) Pressure
	  2) Release

3-2. TIMING OF MECHANICAL OPERATION

Mechanical operation separates thermal head UP/DOWN operation for four positions. The following three operations are performed one motor (Head drive motor) by assembling cam composition and link composition. Paper feed lever operation and control of bar code detection gear are performed by another motor (Paper feed lever motor).
Following is the timing table.

Head drive motor

Position	0	1	2	3
Operation	Home position	Begining detection of ribbon and paper feed	Paper forward rewind, delivery paper	Printing
Head	UP	MIDDLE	MIDDLE	DOWN
Capstan	OFF	OFF	ON	ON
Paper delivery roller	ON	ON	OFF	OFF

Paper feed lever motor

Position	0	1	2
Operation	Home position	Except paper feed	Paper feed
Paper feed lever	DOWN	MIDDLE	UP
Separation roller	OFF	ON	ON
Bar code detection	Impossible	Possible	Impossible

Each element operation timing by mechanical operation

Element / Operation	Head position	Head	Capstan	Paper delivery roller	Lever position	Paper feed lever	Separation roller	Bar code detection
Home	0	UP	OFF	ON	0	DOWN	OFF	Impossible
Bar code detection	1	MIDDLE	OFF	ON	1	MIDDLE	ON	Possible
Begining detection of ribbon and paper feed	1	MIDDLE	OFF	ON	2	UP	ON	Impossible
Pinch roller pressure	2	MIDDLE	ON	OFF	1	MIDDLE	ON	Possible
Printing	3	DOWN	ON	OFF	1	MIDDLE	ON	Possible
Paper rewind	2	MIDDLE	ON	OFF	1	MIDDLE	ON	Possible
Delivery paper	1	MIDDLE	OFF	ON	1	MIDDLE	ON	Possible
Printing end	0	UP	OFF	ON	0	DOWN	OFF	Impossible

Thermal head :

    UP → Thermal head is separated largely from platen.

    MIDDLE → Thermal head is separated little from platen.

    DOWN → Thermal head is pressed to platen.

Capstan :

    ON → Pinch roller is pressed to capstan.

    OFF → Pinch roller is separated from capstan.

Delivery roller:

    ON → Delivery pinch roller is pressed to delivery roller.

    OFF → Delivery pinch roller is separated from delivery roller.

Paper feed lever :

    UP → Paper is pressed to pick-up roller.

    MIDDLE → Paper is separated from pick-up roller, but position where paper feed tray can not be removed.

    DOWN → Position where paper feed tray can be removed.

Separation roller :

    ON → Separation roller is pressed to paper feed roller.

    OFF → Separation roller is separated from paper feed roller.

Bar code detection

    Possible → Detection gear is engaged bar code ring.

    Impossible → Detection gear is not engaged bar code ring.

3-3. MECHANICAL SECTION OUTLINE

No.	Name	No.	Name	No.	Name
1	Capstan drive motor	10	Ink ribbon	19	Platen
2	Head drive motor	11	Pinch roller	20	Paper feed guide
3	Ribbon take-up motor	12	Capstan	21	Bar code detection gear
4	Ribbon supply motor	13	Paper delivery guide	22	Torque limiter for separation roller
5	Paper feed motor	14	Paper delivery pinch roller	23	Separation roller
6	Paper feed lever motor	15	Paper delivery roller	24	Paper feed lever
7	Fan for head cooling	16	Paper feed roller	25	Paper feed tray
8	Thermal head	17	Pick-up roller	26	Paper
9	Head drive cam	18	Ribbon guide roller		
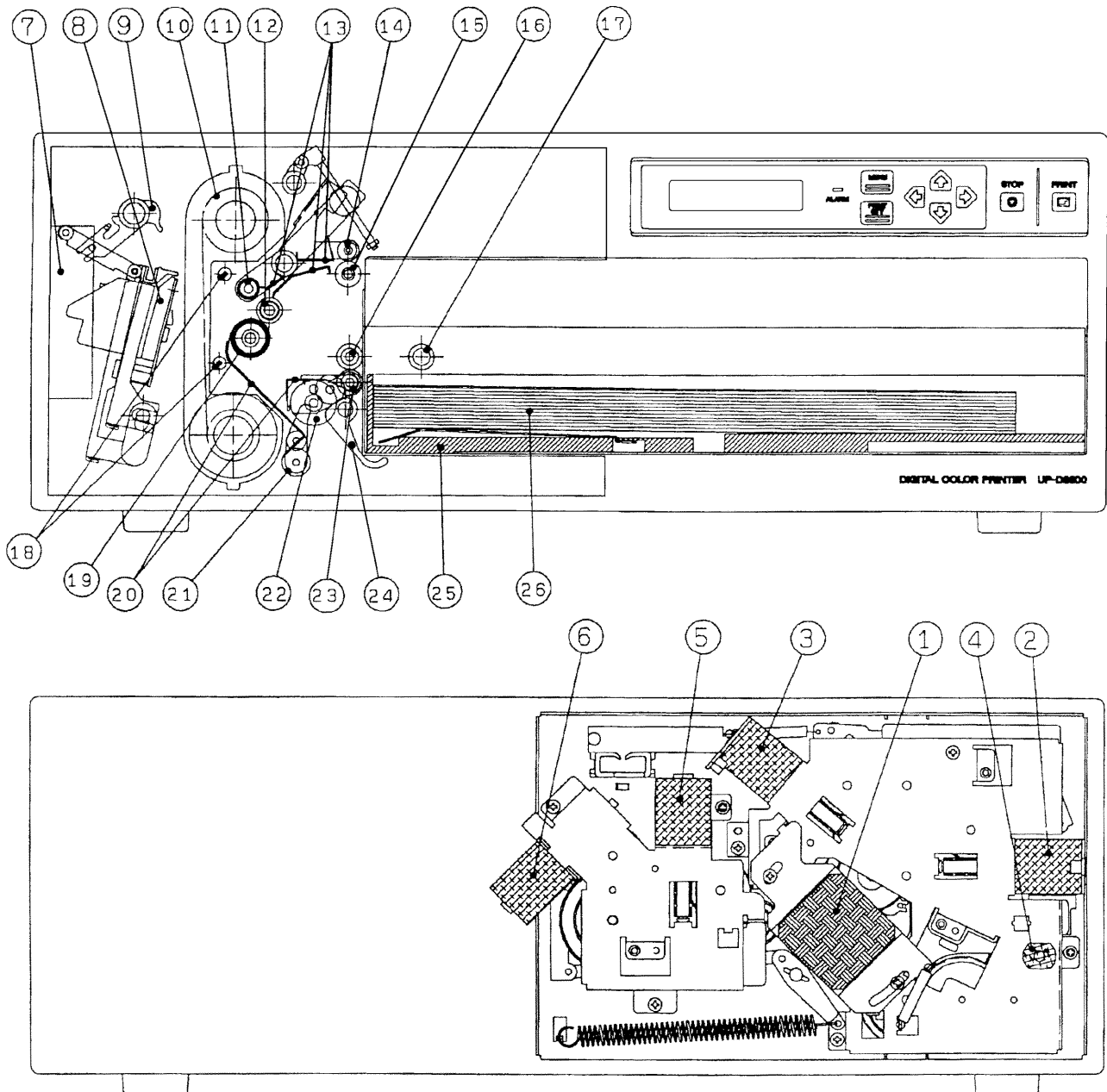
3-4. POSITION AND FUNCTION FOR SENSOR

No.	Name	Kind	Function
1	Bar code sensor	Reflector	Kind discrimination of ribbon
2	Paper edge sensor	Mechanical shutter & interrupter	Beginning detection of paper, jamming detection
3	OHP sensor	Transmission	Discrimination of OHP
4	PATH 0 sensor	Mechanical shutter & interrupter	Detection of paper feed, jamming detection
5	Lever home sensor	Interrupter	Home detection of paper feed lever
6	Lever position sensor	Interrupter	Position detection of paper feed lever
7	PATH 1 sensor	Interrupter	Abnormal detection of stepping motor
8	Supply FG sensor	Interrupter	Detection of ribbon rotation, sending quantity and diameter
9	Ribbon code sensor	Transmission	Beginning detection of ribbon
10	Take-up FG sensor	Interrupter	Detection of ribbon rotation, sending quantity and diameter
11	Cassette eject sensor	Interrupter	Detection whether ribbon cassette is set or not
12	Head home sensor	Interrupter	Home detection of head
13	Head position sensor	Interrupter	Head position detection
14	Paper size sensor	Interrupter	Discrimination of paper size
15	Load FG sensor	Interrupter	Rotation detection of paper feed roller
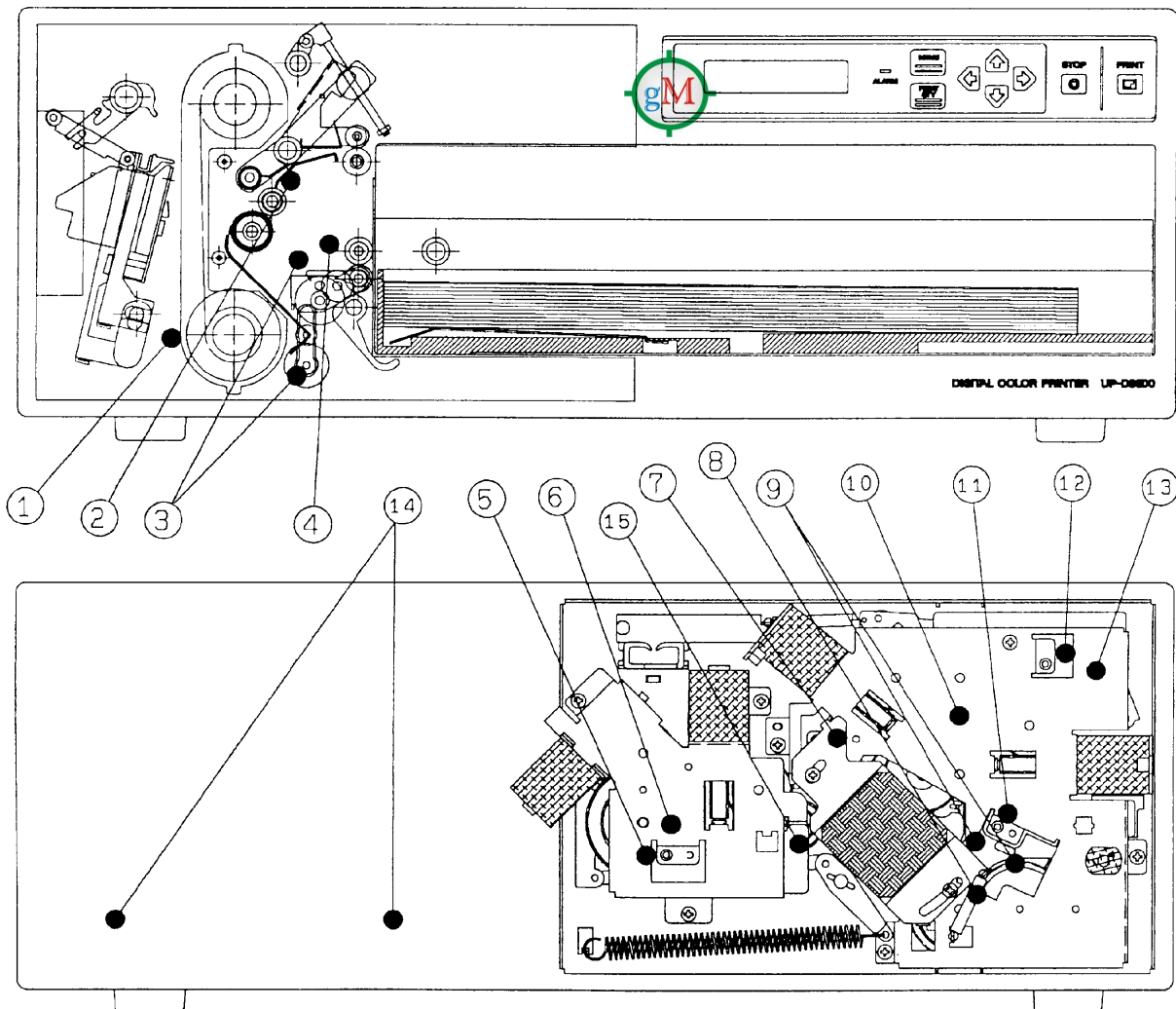
3-5. PRINTING OPERATION DESCRIPTION

Fig. (1)
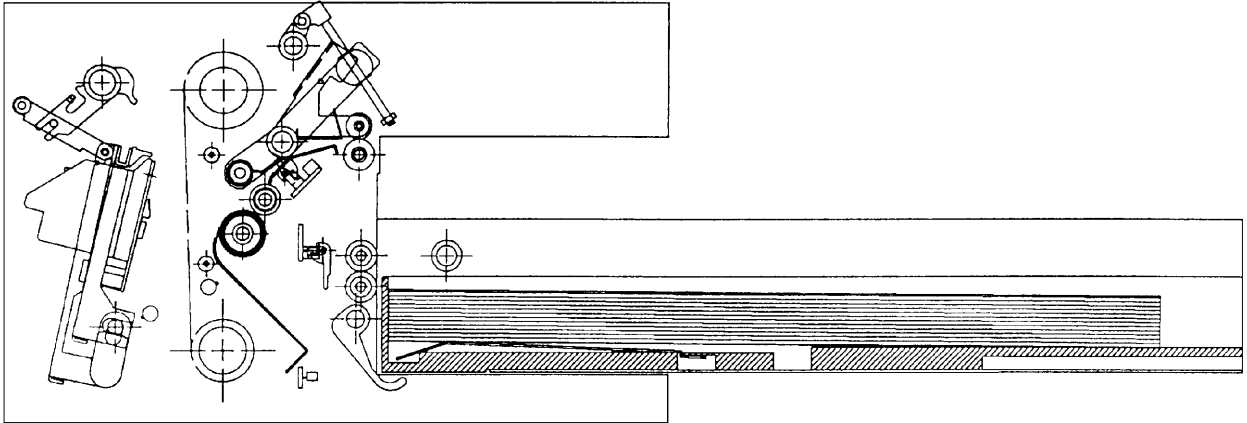
1. Initial condition
   Paper feed tray and ribbon cassette can be removed freely.
2. Depress the print key.
   Starting indication of printing operation.

Fig. (2)
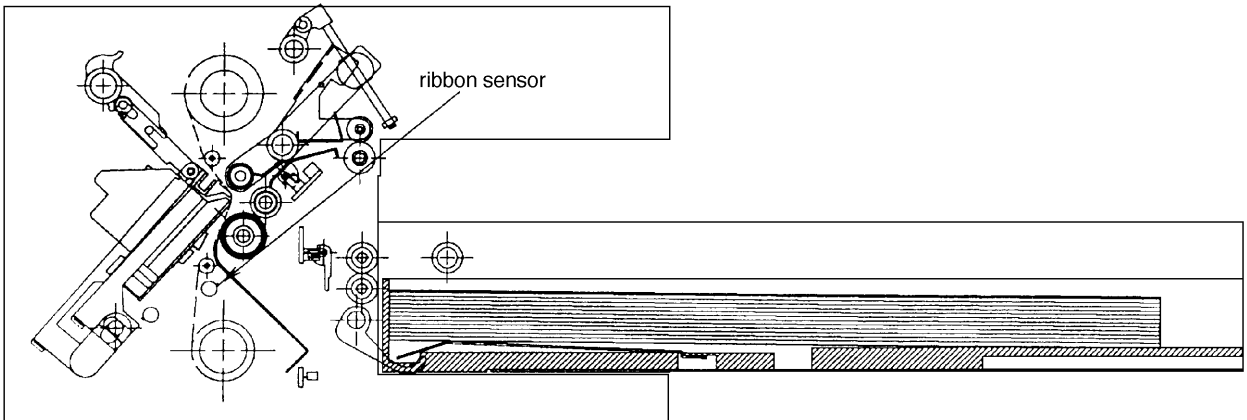
3. Search for the beginning of the yellow ribbon
   • Paper feed lever is set to UP position and head is set to MIDDLE position. Ribbon cassette and paper feed tray can not be removed.
   • Ribbon take-up motor is rotated, ribbon is rewound, if starting mark comes, count of ribbon quantity is set to 100.
   • Ribbon diameter is calculated from take-up and supply FG sensors count quantities between two ribbon codes before yellow ribbon.
   • If ribbon is stopped before coming two ribbon codes, it is judged ribbon end.
   • Ribbon is stopped.

Fig. (3)
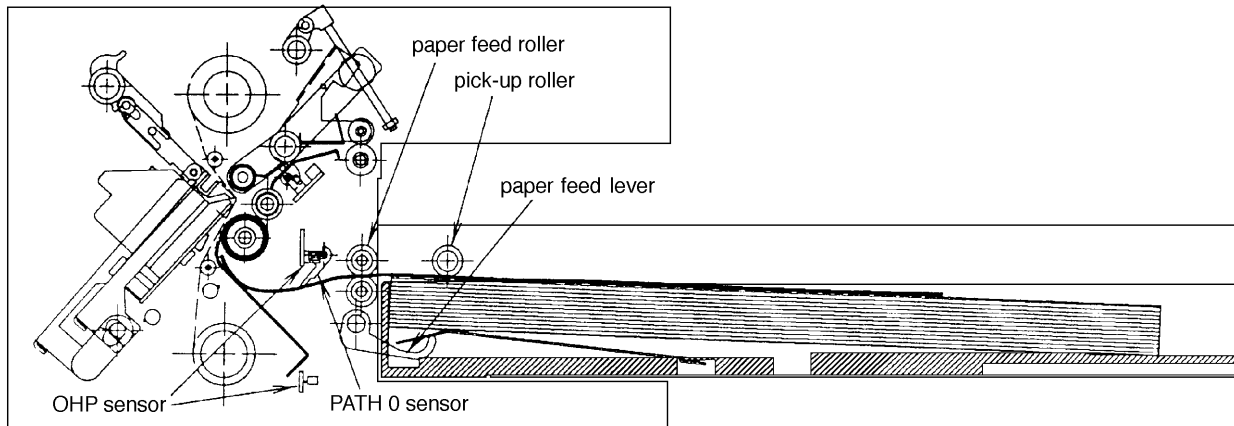
4. Paper feed operation
   - Pick-up roller and paper feed roller are rotated, paper is transported from paper feed tray.
   - When paper passes the PATH 0 sensor, whether OHP or ordinary paper is judged by transmitting or not the optical of OHP sensor.

Fig. (4)
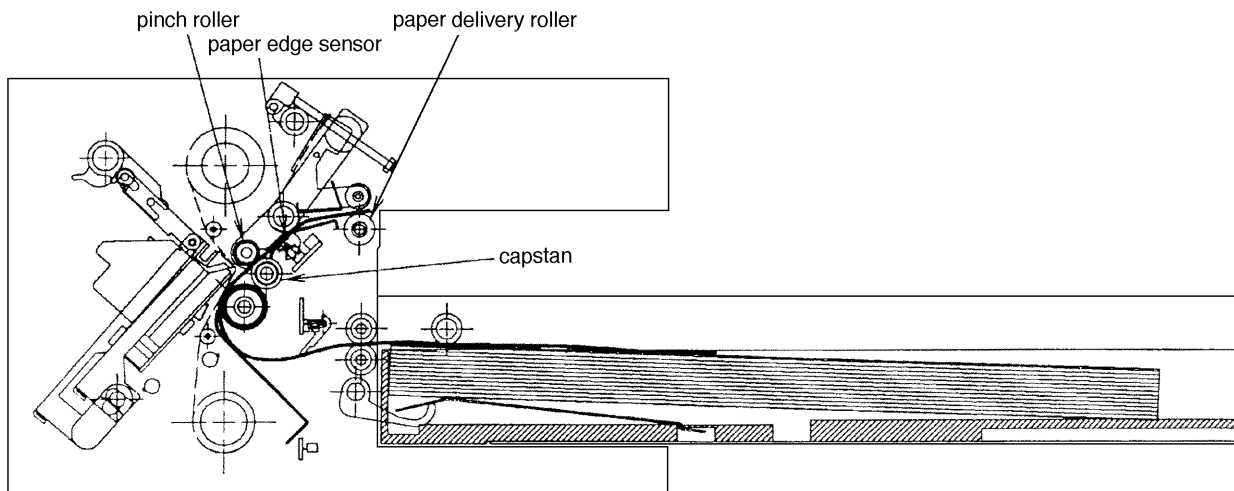
5. Loading operation
   - Paper is fed by turning the ribbon take-up motor while ribbon is moved.
   - When paper comes to the paper edge sensor, ribbon take-up motor is stopped, and then paper is sent by paper feed motor to paper delivery roller. And the ribbon is more sent apporoximately 10 mm, and paper feed roller is stopped.
   - The slacken of the ribbon is taken by ribbon supply motor, paper is transported 10 and a few mm by rotating little paper delivery roller, bend of paper is corrected.
   - Pinch roller is pressed to capstan.

Fig. (5)
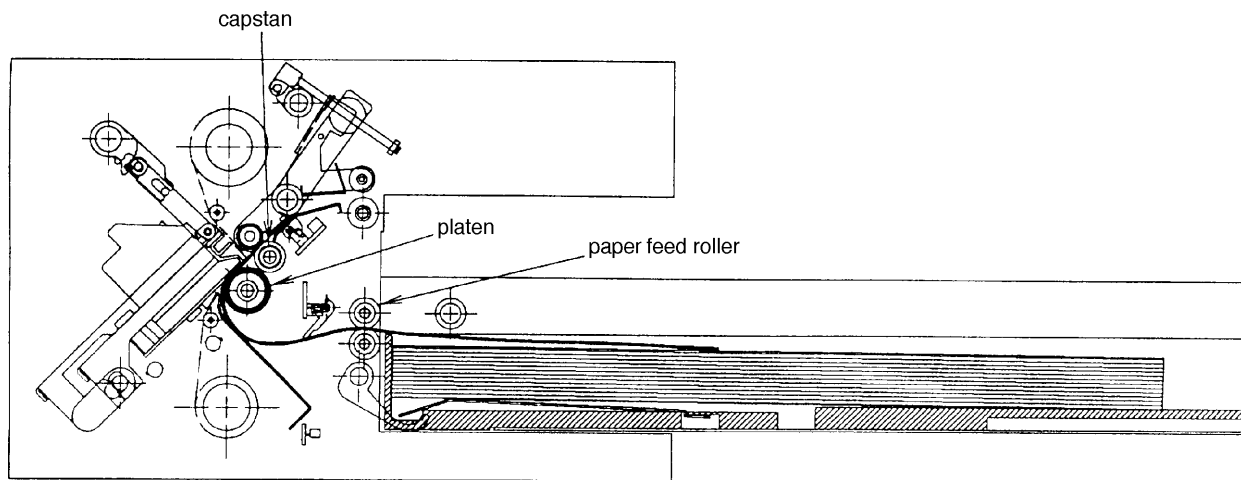
6. Beginning detection of paper
   • As paper feed is performed while ribbon is sent, ribbon is rewound to the position where after beginnig detection of ribbon. Paper is rewound.
   • At that time, capstan and paper feed roller are rotated reversely.
     Paper passes paper edge sensor, and is rewound to just before removing the capstan.
   • Ribbon is sent to true printing position from ribbon code.
   • While ribbon is back tensioned by ribbon supply motor, picture comes to center of the paper by operating the paper feed roller and capstan, after that the head is pressed to platen.

Fig. (6)
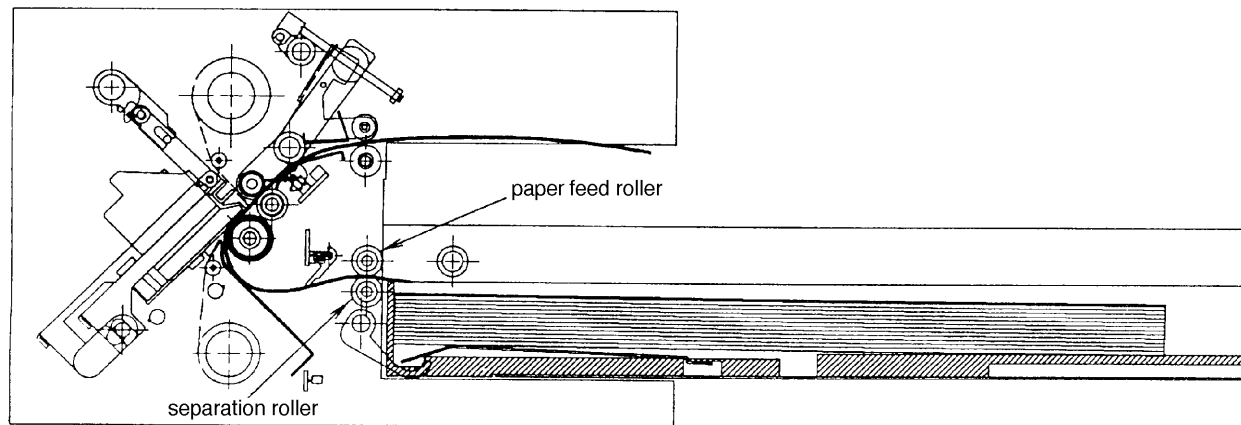
7. Yellow printing
   • Ribbon take-up and ribbon supply motors are rotated so that tension becomes calculated value from ribbon diameter.
   • After capstan is rotated 1mm without loading, yellow color printing is performed. At that time, until paper is separated from separation roller, paper feed roller is rotated with printing speed.
   • After printing, paper feed roller is rotated 0.5 mm without loading.

Fig. (7)

pass changing point
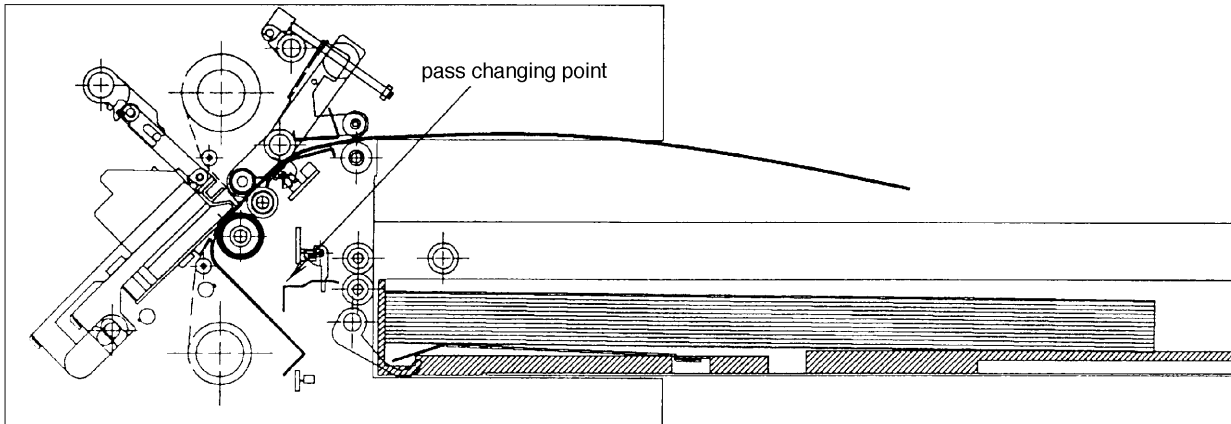
8. Yellow printing completion, and the ribbon sticking and peeling off.
   • After yellow printing, in case the most rear edge of printing paper does not come to the pass changing point. While ribbon is moved, paper is more sent about 10 mm. Ribbon and paper after printing are peeled off. After that, head is set at MIDDLE position. Paper is sent until the paper comes the pass changing point.
   • After yellow printing, in case the most rear edge of printing paper overs the pass changing point. Head is set to MIDDLE position. Ribbon take-up motor is rotated reversely little to slacken the ribbon. Paper is rewound about 20 mm by ribbon supply motor with back tension, ribbon and paper after are peeled off.

Fig. (8)
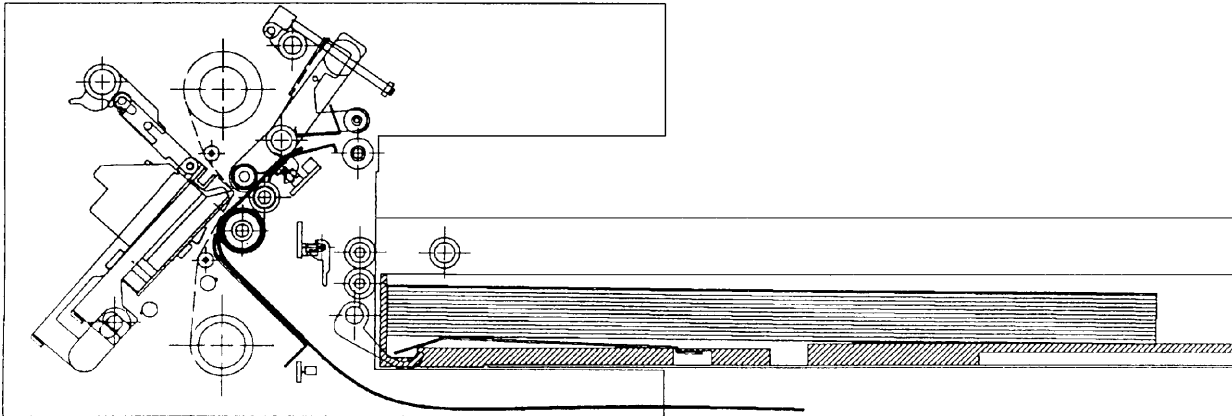
9. Return of paper & beginning detection of magenta ribbon
   • In case ordinary paper, while ribbon is sent to next ribbon code, the paper is returned to the printing position by rotating capstan reversely.
   • In case OHP, paper is returned to the printing position by rotating capstan reversely, ribbon is sent to next ribbon code.
   • After that, ribbon is sent from ribbon code to true print position.

Fig. (9)
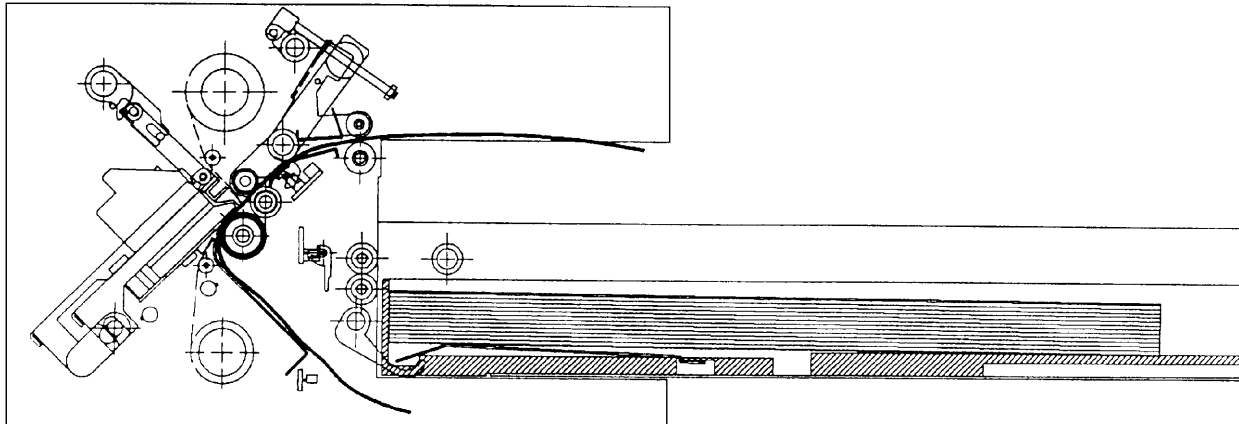
10. Magenta printing
    - The head is pressed to the platen. Ribbon take-up and ribbon supply motors are rotated so that the tension becomes calculated value from ribbon diameter.
    - After capstan is rotated 1mm without loading, magenta color printing is performed.
    - After printing, capstan is rotated 0.5 mm again without loading.

11. Magenta printing completion, and the ribbon sticking and peeling off
    - Same as Fig (7). After magenta printing, head is set at MIDDLE position. Ribbon is slackened by little rotating reversely ribbon take-up motor. While ribbon is tensioned toward rear by ribbon supply motor, paper is returned 20 mm, ribbon and paper after printing are peeled off.

12. Return of paper and beginning detection of cyan ribbon
    - Same as Fig (8), operation description is same as 9.

13. Cyan printing
    - Same as Fig (9), operation description is same as 10.

14. Cyan printing completion, and the ribbon sticking and peeling off
    - Same as Fig (7). After cyan printing , while ribbon is moved as it is, paper is more sent about 8 mm, ribbon and paper after printing are peeled off.

Fig. (10)
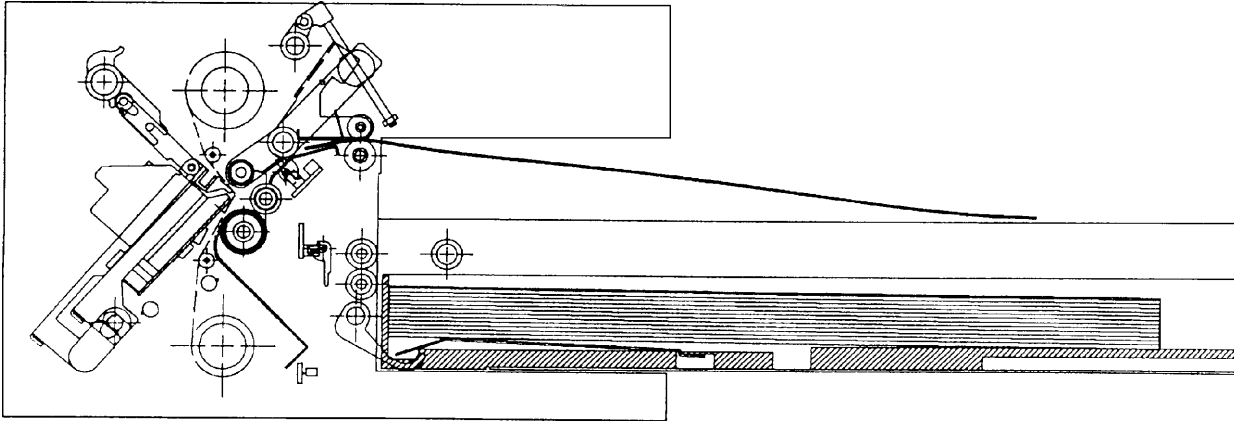
15. Delivery paper operation
    • Head is separated from platen, pinch roller is separated from capstan, paper delivery pinch roller is pressed to paper delivery roller.
    • Slack of ribbon is taken by ribbon supply motor. After that paper is passed through paper delivery roller completely by rotating capstan and paper delivery roller.

Fig. (11)
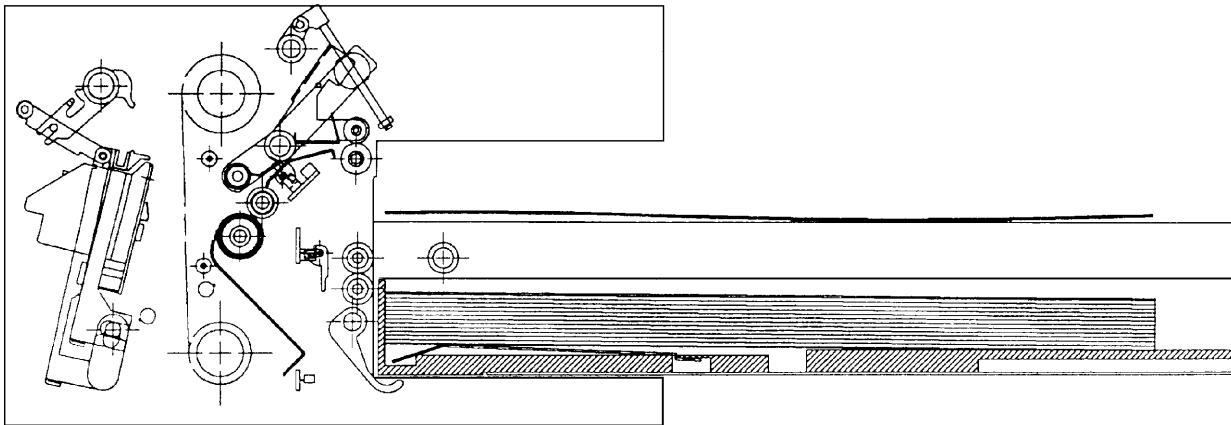
16. Operation after delivery paper
    • Paper feed lever is moved to UP, once paper is engaged paper feed roller by rotating paper feed motor 300 ms correctly. After that, paper feed lever is moved to MIDDLE, and paper feed motor is rotated 400 ms reversely. Furthermore, paper feed lever is moved to UP, paper feed motor is rotated 200 ms reversely. This means that papers out of paper feed tray are returned to the paper feed tray. (This means to prevent slack of rear portion of remaining paper in the paper feed tray.)
    • Paper feed lever is moved to MIDDLE.
    • Ribbon is rotated to beginning of next yellow.
    • Head and paper feed lever are moved to home position, ribbon cartridge and lock of paper feed tray is released. The unit becomes on standby mode.
17. All operations are completed.

3-6. TIMING FOR BAR CODE DETECTION

1. With ribbon cassette and paper feed tray with the paper are inserted, the time when power switch is turned on.
2. Power is turned on except above condition, after that, ribbon cassette and paper feed tray are inserted.
3. Once ribbon cassette is removed, and when it is inserted again.

Operation of bar code detection

bar code sensor   bar code ring
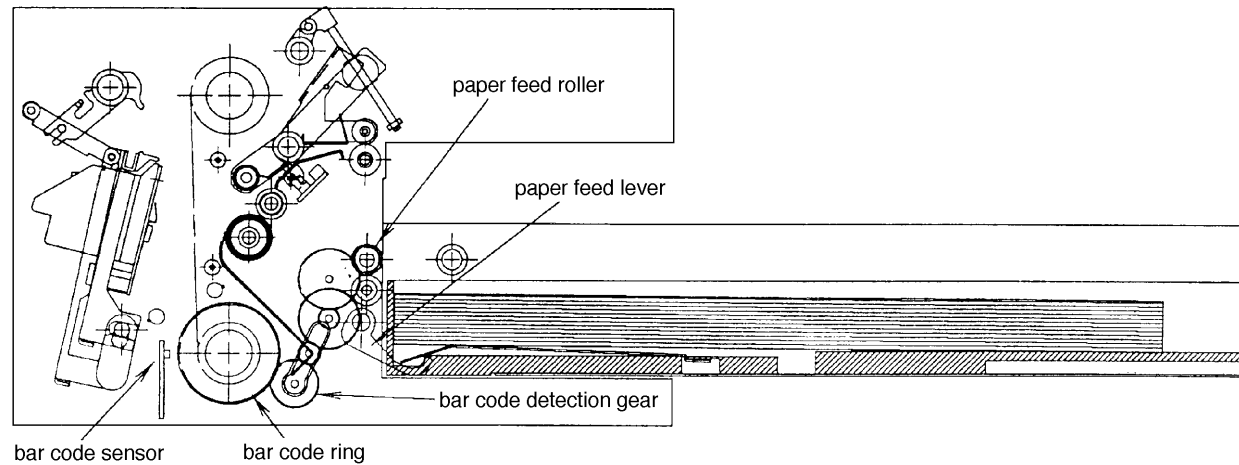
1. Paper feed lever is moved to printing position.
2. Paper feed roller is rotated reversely, bar code ring is rotated by engaging bar code detection gear.
3. Bar code sensor detects the bar code.

SECTION 4
CIRCUIT OPERATION DESCRIPTION

4-1. SY-270 BOARD, MEC-11 BOARD CIRCUIT OPERATION DESCRIPTION

SY-270 board is composed by system control block and mechanism control block and thermal head control block. These each block processes or controls following items.

- System control section
  program transmission to each circuit board
  transmission control between each circuit boards
  control of key
  LCD indication
- Mechanism control section
  control of each motor
  process of each sensor
- Thermal head control section
  gamma correction
  head voltage control
  data transmission from memory
  picture quality correction (PQC IC)
  head data transmission

MEC-11 board is composed by drive IC of each motor, sensor detection circuit, sensor LED control circuit and EEPROM.

1. System Control Section

a) Program transmission to each circuit board

When SY-270 board is rising, nRESET and nSTNBY are set to L and sent them to each circuit board CPU in order to stand by hardware. The program is sent to SRAM of each circuit board. Following figure is chart for sending from SY-270 board to IF-610 board (SEL=4).
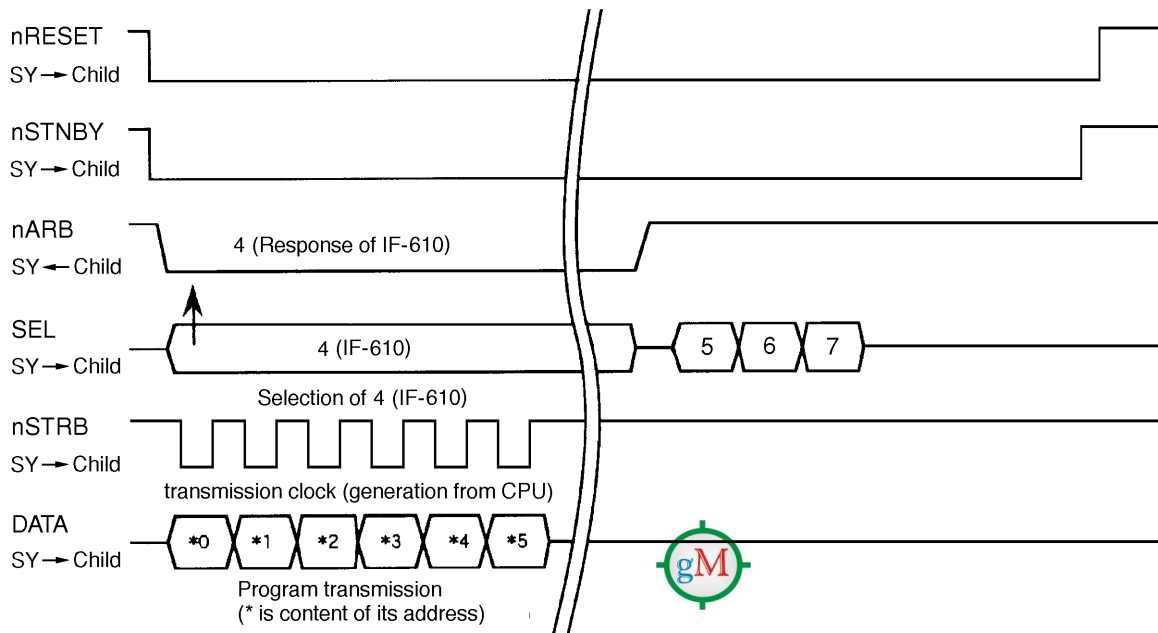
b) Address map

   All firmwares are stored at IC112 (flash memory) on the SY-270 board. Address 00000H
   through 3FFFFH are initial data and they stores the program for controlling the unit operation
   and firmware rewriting as shown below.
   The firmwares are stored at address 40000H to 7FFFFH. These territories are rewritten by
   every grading up the version.
   Just when the power is turned to on by control line B2 from CPU, A18 of IC112 is L, after that,
   it becomes to H. This is moved to the firmware.
   Programs of SY-270 board, program data transfer to IF-610 board and FMY-15 board and
   gamma correction data are stored at each territory as shown below, and is switched by control
   line B0 and B1 from CPU.
   For detail of SY-270 board address map is shown below.

00000H	Initial data
3FFFFH	
40000H	Firmware
7FFFFH	

00000H (40000H)	SY-270 program
10000H (50000H)	
18000H (58000H)	FMY-15 program
20000H (60000H)	IF-610 program
30000H (70000H)	
38000H (78000H)	Gamma correction data
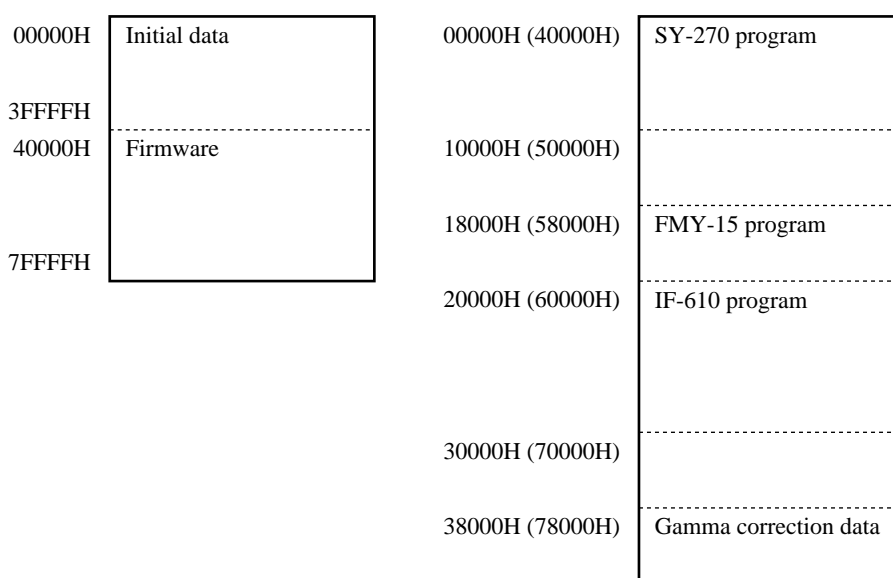
0000H through F3FFH	Program
F400H through F5FFH	Control line s=0 : Gamma selection (PQC IC) s=1 : VDC IC
F600H through F6FFH	Control line s=0 : GRAY SRAM s=1 : PQC IC
F700H through F703H	IC105 (bus control)
F710H through F713H	IC106 (motor/sensor)
F720H	LCD
F730H through F731H	Average resistance value
F740H	IC113 (color switching of GRAY SRAM)
F750H	IC106 (sensor)
F780H through FF7FH	Reserve
F780H through FF7FH	2kB SRAM
FF80H through FFFFH	I/O port

   F400H through F5FFH and F600H through F6FFH are switched by control line S from CPU.

c) Transmission control between each board

Serial communication between each board (SY-270 board ⇔ other board) is performed by time division mutual toward one system.

Sequence of this timing division is performed as follows. Baud rate is 31250bps.

• When receiving (Child data ⇒ SY-270 board)

SEL

nARB

waiting the
communication possible

nRTS

RxD
SY ← Child
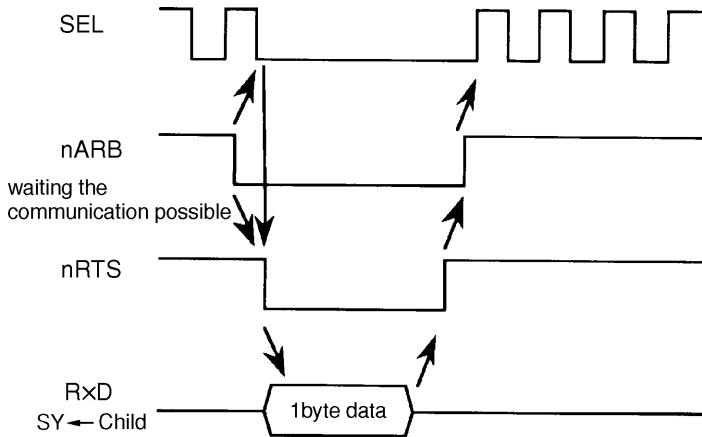
1byte data

1) Before data sending, child board sets nARB to L.
2) SY-270 board ensures nARB to L, SY-270 board stops rotation of nSEL and lowers nRTS.
3) Child board sends the data 1byte.
4) SY-270 board rises RTS, child rises nARB.
5) When nARB is risen, SY-270 board performs rotation again.

• When transmitting (SY-270 board data ⇒ Child)

SEL
SY → Child

TxD
SY → Child

1byte data

IC307 3pin
IC307 ← Child

nCTS
SY ← IC307
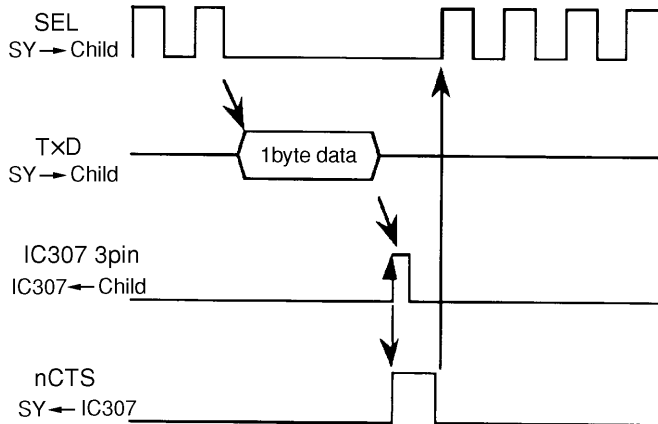
1) SY-270 board stops rotation by child which want to send nSEL.
2) SY-270 board sends 1byte data.
3) Child board rises RTS. CTS is risen by beating clock of IC307 (D,FF) on SY-270 board.
4) SY-270 board ensures CTS was risen, and clears CTS again to perform rotation again.

d) Key control

Key control is composed by two control wires (KEY_EN0, 1 : key scan) and four data wires (KEY_DAT0-3 : key information). Following figure is key control timing chart. Right side table is key matrix.

	KEY_EN0	KEY_EN1
KEY_DAT0	MENU	RIGHT
KEY_DAT1	QTY	LEFT
KEY_DAT2	PRINT	UP
KEY_DAT3	STOP	DOWN
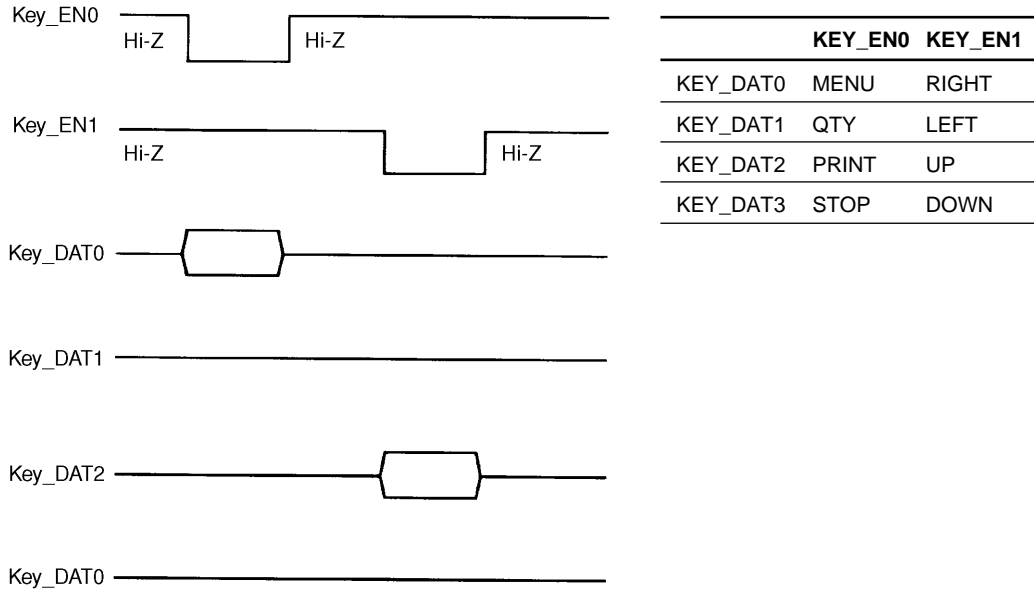
e) LCD control

Control wire of LCD module is eleven of D0-7, R, R-nW, nE. Data wire of D0-7 is connected to data bus via mutual toward buffer of IC107.

2. Mechanism Control Section

a) Capstan motor control

Capstan is driven by a stepping motor. Excitation system of stepping motor uses 1-2 phase excitation system (negative logic). This motor (CN4-2, 5) rotates paper delivery roller and capstan by head position and combination.

Drive IC, IC101 (MEC-11 board) performs constant current drive. And when printing 150dpi, width of 1 line becomes two times by rotating two times motor speed.

b) Head motor drive

This motor performs the thermal head up and down. This motor and head home position sensor (described later) move thermal head four positions, home, paper feed, paper sending, printing. (CN4-10, 11)

Drive IC is IC102 (MEC-11 board).

	CN4-10pin	CN4-11pin
UP	1	0
DOWN	0	1
BRAKE	1	1
OTHERS	0	0

c) Paper feed lever motor drive

This motor performs paper feed lever up and down. Paper feed lever has three positions, home, printing, paper feed. (CN4-8, 9)

Drive IC is IC105 (MEC-11 board).

	CN4-8pin	CN4-9pin
UP	1	0
DOWN	0	1
BRAKE	1	1
OTHERS	0	0

d) Paper feed roller motor drive

This motor rotates paper feed roller, pick-up roller and bar-code gear. When paper feed lever is placed at printing, bar-code gear transmits power by rotating reversely. And when yellow printing, rotation of paper feed roller is controlled by PWM driving. (CN4-6, 7)

Drive IC is IC106 (MEC-11 board).

	CN4-6pin	CN4-7pin
Feeding direction	1	0
Reverse direction	0	1
BRAKE	1	1
OTHERS	0	0

e) Ribbon take-up motor drive

This motor is used to take-up ink ribbon. This motor stabilizes to constant the tension of ink ribbon by PWM driving. Take-up motor controls only ribbon sending direction by PWM. (CN4-12, 13)

Drive IC is IC104 (MEC-11 board).

	CN4-12pin	CN4-13pin
FW (Sending direction)	1	PWM
BW (Reverse direction)	0	1
BRAKE	1	1
OTHERS	0	0

f) Ribbon supply motor drive

This motor controls back-tension of ink ribbon. This motor is controlled with PWM (both directions of ribbon) to stabilize constantly the back-tension of ink ribbon. (CN4-14, 15)

Drive IC is IC103 (MEC-11 board).

	CN4-14pin	CN4-15pin	IC106-9pin	IC106-13pin	IC101-46pin
FW (Feeding direction)	1	PWM	1	0	PWM
BW (sending direction)	PWM	1	0	1	PWM
BRAKE	1	1	1	1	X
OTHERS	0	0	0	0	0

g) Fan motor drive

Fan motor operates during printing and the time when head cooling is needed. (CN4-16)

h) Take-up/supply ribbon FG sensor (CN5-8, 9)

Function   : These FG sensors detect each rotation of take-up or supply motor.
Level   : Rectangle wave output
Check method   : Self diagnosis

i) PATH 0 sensor (CN5-16)

Function   : This is a mechanism sensor that is placed at rear of feed roller. As this is a mechanism sensor, this sensor can judge the pass without discrimination of OHP sheet or ordinary paper. This is composed by photo interrupter and shutter.
Level   : When passing through the paper, sensor indicates H.
Check method   : Self diagnosis

j) PATH 1 sensor (CN5-17)

    Function   : This sensor detects rotation of stepping motor and detects condition of the motor.

    Level   : Rectangle wave output

    Check method : Self diagnosis

k) Paper edge sensor (CN5-10)

    Function   : This is a mechanism sensor that is placed at rear of capstan roller. Same as PATH 0 sensor, this is a mechanism sensor, so, this sensor can judge the pass without discrimination of OHP sheet or ordinary paper. This is also composed by photo interrupter and shutter.

    Level   : When passing through the paper, sensor indicates H.

    Check method : Self diagnosis

l) Paper size sensor (CN5-12, 14)

    Function   : This sensor detects printing paper size in the paper feed tray. Two sensors combination judge paper size and whether there is paper or not.

    Level   : When depressing the sensor, indication is H.

    Check method : Self diagnosis

m) Load FG sensor (CN4-18)

    Function   : This sensor detects rotation of load motor.

    Level   : Rectangle wave output

    Check method : Self diagnosis

n) Head home/position sensor (CN5-4, 5)

    Function   : This sensor detects position of thermal head.

    Level   : Refer to lower table.

    Check method : Self diagnosis

Head position	Home sensor	Position sensor
Home position	0	1
Position 1, 2, 3	1	0
OTHERS	1	1

o) Paper feed lever home/position sensor (CN5-6, 7)

    Function   : This sensor detects position of paper feed lever.

    Level   : Refer to lower table.

    Check method : Self diagnosis

Lever position	Home sensor	Position sensor
Home position	0	1
Position 1, 2	1	0
OTHERS	1	1

p) Ribbon cassette sensor (CN5-2)

    Function   : This sensor detects whether there is ink ribbon cassette or not. This is also mechanism sensor that is composed by photo interrupter and shutter.

    Level   : When depressing the sensor, indication is H.

    Check method : Self diagnosis

q) LED_ON_nOFF Circuit (CN5-18)

    Function   : This circuit turns ON or OFF LED of each sensor between items (h)→(q).

                        This is performed self diagnosis of each sensor.

    Level   : Usual (when LED lights ON) is H.

    Check method : When performing self diagnosis, if all sensors are error, this circuit may be

                        damaged.
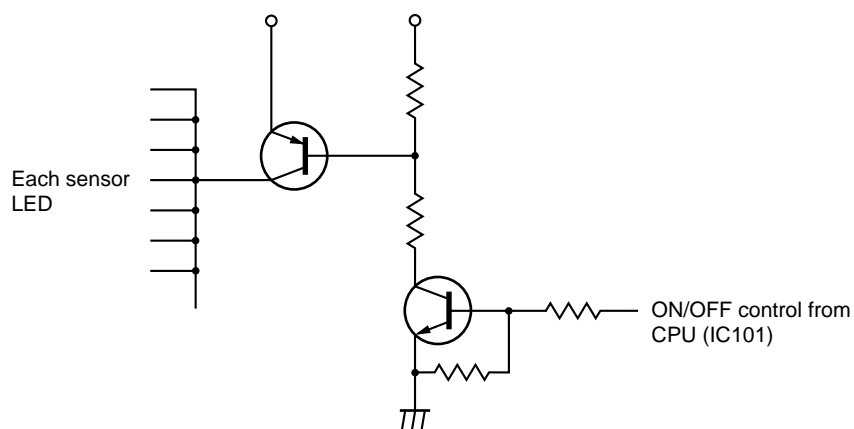
r) Bar-code sensor/luminance quantity adjustment (CN5-11, 20)

    Function   : This reflection sensor reads 12bit bar-code attached to ink ribbon. Pair LED

                        luminance is set to obtain the most suitable luminance quantity. When

                        reading ribbon code every time, the threshold level value for judging L or H

                        is changed to the most suitable value.

    Level   : Reflection portion of bar-code is L, black portion is H.

    Check method : Ribbon cassette with bar-code is inserted, and make sure that ribbon error is

                        not indicated. (It can not be obtained by self diagnosis.) If ribbon error is

                        indicated, make sure the threshold level and, paper feed lever should be

                        moved to printing position, load motor should be rotated reversely, make sure

                        the sensor output.
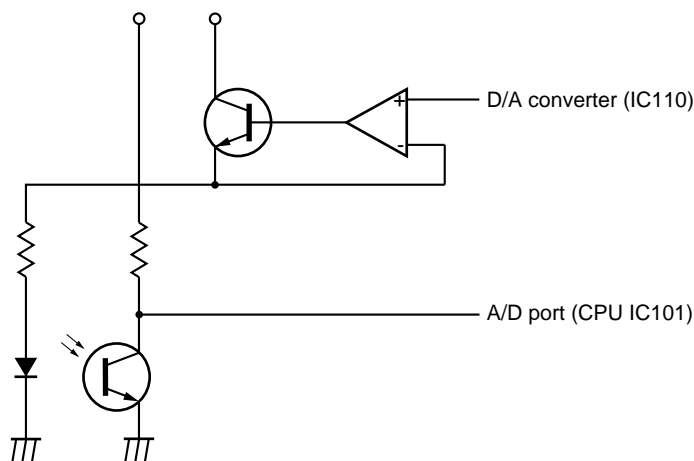
s) Ribbon code sensor/luminance quantity adjustment (CN5-3, 19)

    Function   : This is a transmission type sensor that reads ribbon code and starting mark on the ink ribbon. Pair LED luminance is set to obtain the most suitable luminance quantity. When reading ribbon code every time, the threshold level value for judging L or H is changed to the most suitable value.

    Level   : Ribbon code portion is H, others are L

    Check method   : Make sure the threshold level, ribbon cassette should be inserted, ribbon should be rotated correctly, make sure the sensor output.

t) OHP sensor/luminance quantity adjustment (CN5-15, 21)

    Function   : This is a transmission type sensor that detects paper kind after feeding paper. Pair LED luminance is set to obtain the most suitable luminance quantity. When reading ribbon code every time, the threshold level value for judging L or H is changed to the most suitable value.

    Level   : Ordinary paper is H, OHP is L.

    Check method   : Make sure the threshold level, transmit the paper, and make sure sensor the output.

u) Head thermistor (CN7-27)

    Function   : This thermistor measures temperature of the thermal head.

    Level   : Approximately 2.5V at the normal temperature (25°C)

    Check method   : Measure the voltage of thermistor.

v) Room thermistor (CN4-17)

    Function   : This thermistor measures the temperature at the inside of the unit.

    Level   : Approximately 2.5V at the normal temperature (25°C)

    Check method   : Measure the voltage of thermistor.

3. Thermal Head Control Section

Data current of thermal head control section is as follows.
Memory→Gray correction→Picture quality correction IC→Resistance value correction→Drive IC→Thermal head

a) Gray correction IC
    When printing, gray balance correction curve of number that is set at [GRAY ADJUST] of ordinary menu is stored at gray correction SRAM (IC203).
    Self diagnosis of address and data bus of gamma SRAM peripheral can be performed.

b) Picture quality correction
    IC204 outputs request signal to the memory at rising edge of PRINT_PLS0 from CPU. And receives the gray corrected data.
    IC204 performs gamma correction edge emphasis and heat store correction and outputs to the next with 1 line delayed. Gamma correction curve is stored at flash memory (IC112).
    When printing, gamma curve is selected and stored at IC204 by temperature of the time and a kind of paper.

c) Resistance value correction
    This is composed by two ROMs, IC205 (Resistance value data of the head) and IC206 (Resistance value correction curve).
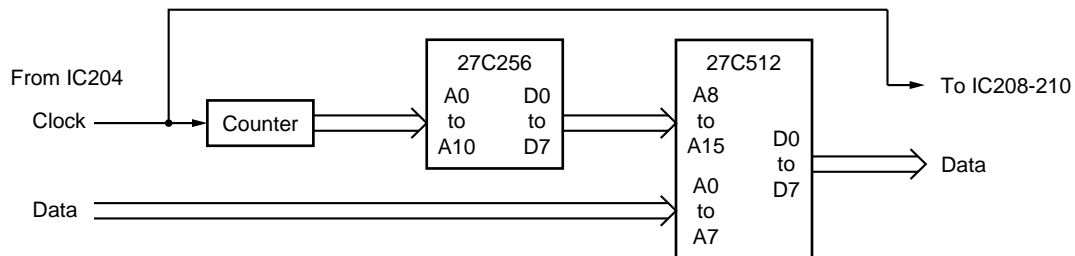
d) Drive IC
    IC208 to 210 output request signal to IC204 at rising edge of PRINT_PLS1 from IC204. And receive the resistance value corrected data, and send PWM converted data to the head with 1 line delayed.
        Output data of IC208 : CN7-1 to 8
        Output data of IC209 : CN7-9 to 16
        Output data of IC210 : CN7-17 to 20
    Furthermore, IC208 outputs HED_CLK (CN7-22) and HED_LATCH (CN7-24) to the head.

e) Line quantity correction IC

This IC corrects voltage changes of head elements that is turned on the electricity by 1 line. Data is input from IC208 through 210, according to it's data quantity, width of head $\overline{\text{STROBE}}$ (CN7-25) is adjusted.

f) Head voltage control

This unit does not need the head voltage adjustment basically. But head voltage is not always stabilized by heat store of the head or difference between papers. When head voltage is less than 16V or more than 23V, the head or power supply is abnormal.

g) Head control section timing chart

nHED_ACTV0
BUS→IC204

PRNT_PLS0
CPU→IC204

nDREQ
IC307→BUS

nDACK
BUS→IC307

DCK0
BUS→IC204

MDB0-7
BUS→IC204

nHED_ACTV1
IC204→IC208-210

PRNT_PLS1
IC204→IC208-210

nDREQ1
IC204→IC208-210

nDACK1
IC204→IC208-210

DCK0
IC204→IC208-210

PD0-7
IC204→IC208-210

HED_CLK
IC208→HEAD

HD1-20
IC208-210→HEAD

nHED_LATCH
IC208→HEAD

nSTRB
IC211→HEAD
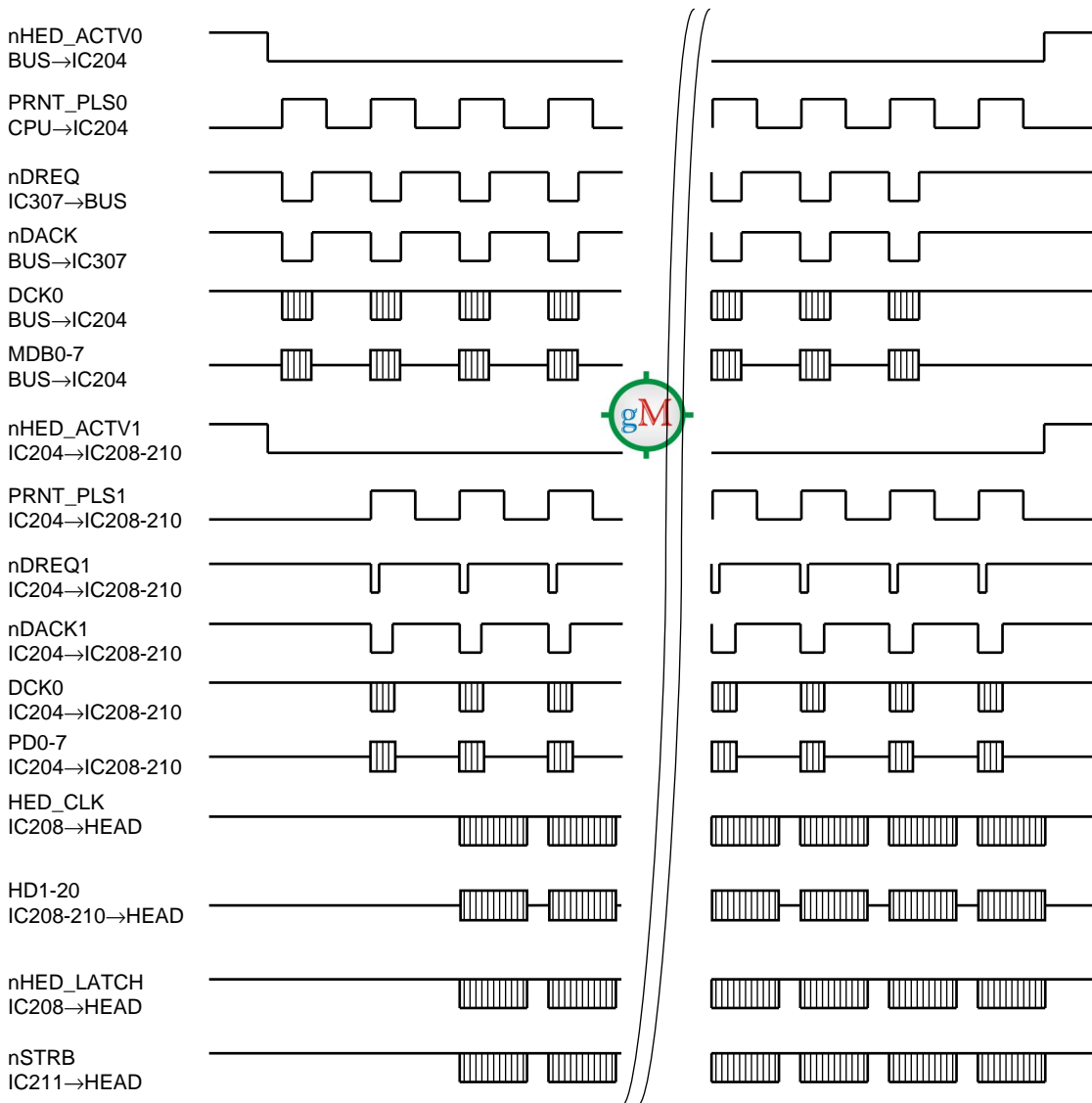
4. Port Map

a) CPU (IC101) Port map

Terminal	Signal line name	I/O	Function
1	nRESET	I	Reset of CPU
2	XTAL		Clock oscillator (20MHz)
3	EXTAL		Clock oscillator (20MHz)
4	MD1	I	Appointment of CPU operation mode
5	MD0	I	Appointment of CPU operation mode
6	nNMI	I	Non maskable interrupt
7	nSTBY	I	Stand-by
8	Vss		GND
9	nARB	I	Communication between daughter boards
10	RxD	I	Receiving data
11	TxD	O	Transmission data
12	Vss		GND
13	nWAIT	I	Wait
14	ø		System clock
15	nAS	O	Address strobe
16	nWR	O	Write signal
17	nRD	O	Read signal
18	nIRQ0	I	DREQ break into
19	B2	O	Bank switch of flash memory
20	nDACK	I/O	Print data acknowledgment
21	KEY_EN0	O/Hi-Z	Key scan
22	KEY_EN1	O/Hi-Z	Key scan
23	KEY_DAT0	I	Key data
24	KEY_DAT1	I	Key data
25	KEY_DAT2	I	Key data
26	KEY_DAT3	I	Key data
27	RS	O	LCD
28	R_nW	O	LCD
29	AVss		Ground of A/D conversion
30	RBN_CD_SENS	I	Input of ribbon code sensor
31	BCD_SENS	I	Input of barcode sensor
32	OHP_SENS	I	Input of OHP sensor
33	HED_THERM	I	Thermistor value of thermal head
34	ROOM_THERM	I	Thermistor value of room
35	nCTS_LATCH	I	nCTS
36	nDREQ	I/O	Print data request
37	P77	I	
38	AVcc		Power supply of A/D conversion
39	S	O	Address territory switch
40	PRNT_PLS0	O	Print pulse

Terminal	Signal line name	I/O	Function
41	nHED_ACTV0	O	Head active
42	nRTS	O	Receiving possible (Low active)
43	B0	O	Bank switch of flash memory
44	B1	O	Bank switch of flash memory
45	PWM0	O	Take-up motor PWM
46	PWM	O	Supply motor PWM
47	Vcc		Power supply
48	A15	O	Address
49	A14	O	Address
50	A13	O	Address
51	A12	O	Address
52	A11	O	Address
53	A10	O	Address
54	A9	O	Address
55	A8	O	Address
56	Vss		GND
57	A7	O	Address
58	A6	O	Address
59	A5	O	Address
60	A4	O	Address
61	A3	O	Address
62	A2	O	Address
63	A1	O	Address
64	A0	O	Address
65	D0	I/O	Data
66	D1	I/O	Data
67	D2	I/O	Data
68	D3	I/O	Data
69	D4	I/O	Data
70	D5	I/O	Data
71	D6	I/O	Data
72	D7	I/O	Data
73	Vss		GND
74	DI	I	Control line of EEPROM
75	CLK	O	Control line of EEPROM
76	LD	O	Control line of EEPROM
77	DO	O	Control line of EEPROM
78	SDA	I/O	Control line of external A/D converter
79	SCL	O	Control line of external A/D converter
80	DCK	I/O	Printing data clock

b) PPI (IC105) Port map

Terminal	Signal line name	I/O	Function
1	NC		
2	nCS	I	Tip select
3	GND		GND
4	A1	I	Address
5	A0	I	Address
6	PC7	O	
7	P_TYPE 1	O	Number of the identical images in one printout
8	P_TYPE 0	O	Number of the identical images in one printout
9	nHOT_RESET	O	PQC IC hot reset
10	TRNS_ENB	O	Control line for transmission in printing
11	PRE_HEAT	O	Preheat control line
12	EXTRA	O	
13	CK_SEL	O	Head control clock select
14	SEL0	O	Daughter board select signal
15	SEL1	O	Daughter board select signal
16	SEL2	O	Daughter board select signal
17	NC		
18	nC_RESET	O	Daughter board CPU reset
19	nSTNBY	O	Daughter board CPU stand-by
20	nSTRB	O	Daughter board clock for program transmission
21	nCTS_CLR	O	nCTS_LATCH Clear
22	PB7	O	
23	Vcc		Power supply
24	D7	I	Data
25	D6	I	Data
26	D5	I	Data
27	D4	I	Data
28	D3	I	Data
29	D2	I	Data
30	D1	I	Data

Terminal	Signal line name	I/O	Function
31	D0	I	Data
32	RESET	I	Reset (High active)
33	NC		
34	NC		
35	nWR	I	Write signal
36	MDB7	I/O	Main data bus
37	MDB6	I/O	Main data bus
38	MDB5	I/O	Main data bus
39	MDB4	I/O	Main data bus
40	MDB3	I/O	Main data bus
41	MDB2	I/O	Main data bus
42	MDB1	I/O	Main data bus
43	MDB0	I/O	Main data bus
44	nRD	I	Read signal

c) PPI (IC106) Port map

Terminal	Signal line name	I/O	Function
1	NC		
2	nCS	I	Tip select
3	GND		GND
4	A1	I	Address
5	A0	I	Address
6	nPQC_RESET	O	PQC IC reset
7	ALRM_LED	O	Alarm LED
8	FAN_MTR	O	Fan motor
9	SPLY_MTR0	O	Supply motor
10	HED_MTR0	O	Head motor
11	HED_MTR1	O	Head motor
12	TKUP_MTR0	O	Take-up motor
13	SPLY_MTR1	O	Supply motor
14	HED_HOM_SENS	I	Head home sensor
15	HED_POS_SENS	I	Head position sensor

Terminal	Signal line name	I/O	Function
16	ARM_HOM_SENS	I	Arm home sensor
17	NC		
18	ARM_POS_SENS	I	Arm position sensor
19	TKUP_FG_SENS	I	Take-up FG sensor
20	SPLY_FG_SENS	I	Supply FG sensor
21	P_EG_SENS	I	Paper edge sensor
22	RBN_CST_SENS	I	Ribbon cassette sensor
23	Vcc		Power supply
24	D7	I	Data
25	D6	I	Data
26	D5	I	Data
27	D4	I	Data
28	D3	I	Data
29	D2	I	Data
30	D1	I	Data
31	D0	I	Data
32	RESET	I	Reset (High active)
33	NC		
34	NC		
35	nWR	I	Write signal
36	ARM_MTR1	O	Paper feed lever motor
37	ARM_MTR0	O	Paper feed lever motor
38	LOAD_MTR1	O	Paper feed motor
39	LOAD_MTR0	O	Paper feed motor
40	CAP_MTR_A	O	Capstan motor
41	CAP_MTR_B	O	Capstan motor
42	CAP_MTR_nA	O	Capstan motor
43	CAP_MTR_nB	O	Capstan motor
44	nRD	I	Read signal

5. Relation of Each Sensor Error Indication

a) NO RIBBON

Detection sensor	: Ribbon cassette sensor (photo interrupter)
Cause	: Sensor does not detect ribbon cassette.
Symptom	: 1. Ribbon cassette is not inserted.

        2. Ribbon cassette is not inserted correctly or ribbon cassette was pulled out during printing.

        3. Sensor defective

        4. Mechanism section which interrupts the photo interrupter does not operate smoothly.

b) NO PAPER

Detection sensor	: Paper size sensor 0, 1 or 2 (Photo interrupter)
Cause	: Sensor does not detect paper.
Symptom	: 1. Paper feed tray is not inserted.

        2. Paper feed tray is inserted halfway.

        3. No paper is inserted.

        4. Sensor defective

        5. Mechanism section which interrupts the photo interrupter does not operate smoothly.

        6. Paper is curl largely.

c) RIBBON and PAPER MIS-MATCH

Detection sensor	: OHP sensor (Interructive type) and bar-code sensor (Reflection type)
Cause	: A kind of paper detected by ribbon cassette and a kind of paper detected by bar-code sensor are not coincide.
Symptom	: 1. A kind of ink ribbon and a kind of paper are not coincide.

        2. Either sensor defective

        3. Threshold value defective of either sensor

        4. Bar-code ring defective

d) END OF RIBBON

Detection sensor	: Take up FG sensor (Photo interrupter) and Supply FG sensor (Photo interrupter)
Cause	: It was judged that ribbon is stopped by both FG sensors during beginning detection of ribbon.
Symptom	: 1. Ribbon is ended.

        2. Ribbon is jammed.

        3. Take-up ribbon motor does not operate.

        4. Sensor defective.

e) RIBBON ERROR

Detection sensor : Take up FG sensor (Photo interrupter) and supply FG sensor (Photo interrupter)

Cause : It was judged that ribbon is stopped by both FG sensors during beginning detection of ribbon.

Symptom : 1. Ribbon is jammed.
2. Ribbon is cut at the halfway.
3. Paper or ribbon is stopped at the halfway.
4. Sensor defective
5. Take up ribbon motor does not operate.
6. Take up ribbon motor rotate slowly.

f) HEAD IN COOLING/HEAD IN HEATING

Detection sensor : Head thermistor

Cause : Head temperature is less than 15°C or more than 60°C

Symptom : 1. Head temperature is over than possible printing temperature range (15 to 60°C).
2. Head thermistor defective
3. Head harness defective

g) HEAD CABLE NOT CONNECTED (This is not described in users manual.)

Detection sensor : Head thermistor

Cause : Head temperature can not be measured.

Symptom : 1. Head thermistor defective
2. Head harness defective

h) REMOVE PAPER AND PRESS [>]

Detection sensor : PATH 0 sensor (Photo interrupter) or paper edge sensor (Photo interrupter)
Cause : When feeding paper, paper does not come in a few seconds.
Symptom : 1. Paper is not sent correctly by some reason.
2. Sensor defective. Or mechanical shutter defective.
3. Paper feed motor does not operate.

Detection sensor : PATH 1 sensor (Photo interrupter)
Cause : Capstan motor rotates abnormally during paper rewind.
Symptom : 1. Paper is unnaturally pulled by some reason during paper rewind.
2. Sensor defective
3. Capstan motor does not operate.

Detection sensor : Take up FG sensor (Photo interrupter) and supply FG sensor (Photo
interrupter)
Cause : It was judged that ribbon is stopped by both FG sensors during printing.
Symptom : 1. Paper is stopped by some reason.
2. Abnormal occurs at ribbon.
3. Sensor defective

Detection sensor : Nothing
Cause : When turning the unit ON, it is judged that paper remains in the unit.
(EEPROM memories that the unit is turned OFF during previous printing.)
Symptom : 1. The unit was turned OFF during previous printing.
2. EEPROM defective
3. EEPROM is not initialized.

i) REMOVE PAPER

Detection sensor : PATH 0 sensor (Photo interrupter) or paper edge sensor (Photo interrupter)
Cause : It was judged that paper remains in the internal of the unit during waiting
condition.
Symptom : 1. Paper remains in the internal of the unit.
2. Sensor defective. Or mechanical shutter defective.

j) MECHA TROUBLE

Detection sensor : All of sensors
Cause/Symptom : The unit does not operate correctly by motor or sensor defective.
Countermeasure method : Survey the any sensor defective by using error reset menu.

SECTION 5
SERVICE MODE

5-1. SERVICE MODE

1. Construction

Service mode is composed as follows. ADJUST is added by entering the adjust mode.

- COLOR ADJUST
- GRAY ADJUST
- THRESHOLD
- TOTAL PRINT
- ERROR RESET
- TEST PATTERN
- MANUAL MECHA
- ROM Ver
- PRINTER SELF CHECK
- ADJUST

2. Entering Method
The unit can be entered in service mode by turning on the power switch while [←] and [→] keys on the front panel are depressed. In service mode, ordinary operations are possible. Service mode can be released by turning off the power switch.

3. Content
When entering the service mode, LCD indication becomes as follows.

```
READY
        A4      QTY      1S
        OR
        LET
```

In above condition, entering in menu by pressing [MENU] key.
- COLOR ADJUST (Adjustment of R, G, B, DARK, LIGHT, SHARPNESS, GAMMA or selection of lamination pattern)
  This is as same as usual menu content.
- GRAY ADJUST (Adjustment of gray ballance)
  This is as same as usual menu content.

- THRESHOLD (Threshold level of sensor)

  The current setting threshold levels of three sensors (ribbon code, bar code, OHP) are appeared by depressing [→] key.

RBN	BCD	OHP
110	121	117

Check sensor level whether it is normal or abnormal by dust or something.

Numerical value of threshold.

a. Decision of threshold level

   Decision of sensor H or L level is performed by judging the threshold level that is decided just before printing. When printing is ended, the threshold level that is used in next printing is decided by electric potential of this printing H, L level. Initial value of threshold level is decided by electric potential of receiving light side when adjusting sensor luminance quantity.

b. Numerical value indication

   Electric potential of sensor is obtained by 8bit A/D conversion. Threshold indication is also based by 8bit A/D conversion. Electric potential of each threshold level is obtained as follow expression.

   $$\text{Electric potential} = 5 \times (\text{indication value}/255)$$

c. Abnormal value

   In case indication value is more than 229 (4.5 V) or less than 25 (0.5 V), the value can be judged abnormal.

- TOTAL PRINT (Total printing quantity of thermal head)

  When depressing [→] key, total printing quantity of thermal head is indicated.

TOTAL = 1000

  When depressing [←] key during above indication, total printing quantity of the unit is indicated.

TOTAL = 5000
(Absolute)

- ERROR RESET (Recovery of sensor or motor trouble.)

  When depressing [→] key, abnormal motor or sensor name is indicated.

HEAD MOTOR
[→]

  When repair is completed, next indication is appeared by depressing [→] key. And error condition is recovered by depressing [←] key.

CLEAR : PRESS [←]

• TEST PATTERN (TEST PATTERN PRINTING) (For UP-D70A only)
  By depressing [→] key, following test pattern is indicated.
  select the print pattern using [↑] and [↓] keys.

```
COL STEP                300 ↕
            PRESS [→]
```

By depressing [→] key, following picture is printed. Ribbon remaining quantity is not changed
by this printing. Color adjustment by COLOR ADJUST is not reflected on this printing.

LCD indication	Pattern	Remarks
STR STEP 300	STAIR STEP	For density measurement (300 dpi)
COL STEP 300	COLOR STEP	For density measurement (300 dpi)
COL BAR 300	COLOR BAR	Balance check for 8 base colors (300 dpi)
RAMP 300	RAMP	Check for gray balance (300 dpi)
BLACK 300	ALL BLACK	Check for sticking and temperature rise (300 dpi)
GRAY 300	ALL GRAY	Check for whole unevenness (300 dpi)
TWO GRAY 300	TWOTONE GRAY	Check for head density unevenness (300 dpi)
SIDE BAR 300	SIDE BAR	Check for slip between ribbon and paper (300 dpi)
C HATCH 300	CROSS HATCH	Check for dot aspect (300 dpi)
CHECKER 300	CHECKER	Check for discrepancy less than 1 dot width (300 dpi)
SKEW UP 300	SQUE UP	Check for skew (300 dpi)
SKEW DN 300	SQUE DOWN	Check for skew (300 dpi)
WINDOW 300	WINDOW	Check for color mis-matching (300 dpi)
STR STEP 150	STAIR STEP	For density measurement (150 dpi)
COL STEP 150	COLOR STEP	For density measurement (150 dpi)
COL BAR 150	COLOR BAR	Balance check for 8 base colors (150 dpi)
RAMP 150	RAMP	Check for gray balance (150 dpi)
BLACK 150	ALL BLACK	Check for sticking and temperature rise (150 dpi)
GRAY 150	ALL GRAY	Check for whole unevenness (150 dpi)
TWO GRAY 150	TWOTONE GRAY	Check for head density unevenness (150 dpi)
SIDE BAR 150	SIDE BAR	Check for slip between ribbon and paper (150 dpi)
C HATCH 150	CROSS HATCH	Check for dot aspect (150 dpi)
CHECKER 150	CHECKER	Check for discrepancy less than 1 dot width (150 dpi)
SKEW UP 150	SQUE UP	Check for skew (150 dpi)
SKEW DN 150	SQUE DOWN	Check for skew (150 dpi)
WINDOW 150	WINDOW	Check for color mis-matching (150 dpi)

- MANUAL MECHA (MANUAL MECHANISM OPERATION)

  When detecting trouble portion or checking repair completion or pulling out the jammed paper, each motor can be operated by manual operation.

  [→] key is depressed and a motor is selected by depressing [↑] or [↓] key. Each motor operation is as follows.

  HEAD MOTOR .... head goes up 1 position every time the [→] key is depressed. head goes down 1 position every time the [←] key is depressed.

  LEVER MOTOR ...... paper feed arm goes up 1 position every time [→] key is depressed. paper feed arm goes down 1 position every time [←] key is depressed.

  LOAD MOTOR .... while depressing [→] key, paper feed roller is rotated correctly (toward paper feed direction). while depressing [←] key, paper feed roller is rotated reversely.

  CAPS MOTOR .... while depressing [→] key, capstan motor is rotated correctly. while depressing [←] key, capstan motor is rotated reversely.

  TKUP MOTOR .... while depressing [→] key, ribbon motor (take-up side) is rotated toward ribbon take-up direction. while depressing [←] key, ribbon motor is rotated toward rewind direction.

  SPLY MOTOR .... while depressing [→] key, ribbon motor (supply side) is rotated toward ribbon rewind direction.

- ROM ver (ROM version indication)

  The version of programmable ROM IC112 on SY-270 board is appeared by depressing [→] key.

- PRINTER SELF CHECK (PRINTER SELF DIAGNOSIS FUNCTION)

  Error detected by diagnosis function of each board is appeared by depressing [→] key.

  1. SY CHECKING

     Errors of SY-270 board, MEC-11 board, various motors and sensors are checked.

  2. IF CHECKING

     Error of IF-610 board is checked.

  3. FMY CHECKING

     Error of FMY-15 board is checked.

  Concrete portions and contents of each error are as follows.

SY-270 BOARD SELF DIAGNOSIS ERROR MESSAGE TABLE

ERROR MESSAGE	CONTENT
HEAD HOME SENSOR ERROR	Head Home Sensor or Head Motor Abnormal.
HEAD POSITION SENSOR ERROR	Head Position Sensor or Head Motor Abnormal.
LEVER HOME SENSOR ERROR	Arm Home Sensor or Lever Motor Abnormal.
LEVER POSITION SENSOR ERROR	Arm Position Sensor or Lever Motor Abnormal.
TAKE-UP FG SENSOR ERROR	Take-up FG Sensor or Take-up Motor Abnormal.
SUPPLY FG SENSOR ERROR	Supply FG Sensor or Supply Motor Abnormal.
PAPER EDGE SENSOR ERROR	Paper Edge Sensor Abnormal.
PAPER SIZE 0 SENSOR ERROR	Size 0 Sensor Abnormal.
PAPER SIZE 1 SENSOR ERROR	Size 1 Sensor Abnormal.
PAPER SIZE 2 SENSOR ERROR	Size 2 Sensor Abnormal.
PAPER PATH 0 SENSOR ERROR	Path 0 Sensor Abnormal.
PAPER PATH 1 SENSOR ERROR	Path 1 Sensor and Capstan Motor Abnormal.
LOAD FG SENSOR ERROR	Load FG Sensor and Loading Motor Abnormal.
RIBBON CASSETTE SENSOR ERROR	Ribbon Cassette Sensor Abnormal.
HEAD THERMISTOR SENSOR ERROR	Head Thermistor Sensor and Head Harness Abnormal.
ROOM THERMISTOR SENSOR ERROR	Room Thermistor Sensor Abnormal.
GRAY ERROR	GRAY SRAM (IC203) abnormal.
GAMMA ERROR	GAMMA abnormal of PQC (IC204).
VDC ERROR	VDC (IC211) Abnormal.
PQC ERROR	PQC (IC204) Abnormal.

IF-610 BOARD ERROR CORD TABLE

• DIRECT DRIVE I/O CHECK

1001	IC313 [Q1 2] - IC315 [D1 2]
1002	IC313 [Q2 5] - IC315 [D2 4]
1003	IC313 [Q3 6] - IC315 [D3 6]
1004	IC313 [Q4 9] - IC315 [D4 8]
1005	IC313 [Q5 12] - IC315 [D5 11]
1006	IC313 [Q6 15] - IC315 [D6 13]
1007	IC313 [Q7 16] - IC315 [D7 15]
1008	IC313 [Q8 19] - IC315 [D8 17]
1001-1008 all	In case, output from other board to MDB of IC313 [EN 1] -, IC313 [CLK 11] -, IC315 [G1 1, G2 19] -, BUS.

• DATA BUS SYSTEM CHECK OF BUF1

1009	IC104 [D0 11] - IC106 [A0 2], IC106 [B0 18] -
100A	IC104 [D1 12] - IC106 [A1 3], IC106 [B1 17] -
100B	IC104 [D2 13] - IC106 [A2 4], IC106 [B2 16] -
100C	IC104 [D3 15] - IC106 [A3 5], IC106 [B3 15] -
100D	IC104 [D4 16] - IC106 [A4 6], IC106 [B4 14] -
100E	IC104 [D5 17] - IC106 [A5 7], IC106 [B5 13] -
100F	IC104 [D6 18] - IC106 [A6 8], IC106 [B6 12] -
1010	IC104 [D7 19] - IC106 [A7 9], IC106 [B7 11] -
109-1010	In case, output from other board to DKC of IC106 [DIR 1] -, IC104 [WR 27] -, IC104 [OE 22] -, BUS.

• ADDRESS CHECK OF BUF1

1011	IC104 [A0 10] - IC100 [QA 14], IC104 [A1 9] - IC100 [QB 13]
1012	IC104 [A1 9] - IC100 [QB 13]
1011-1012, 1013	IC104 [A2 8] - IC100 [QC 12]
1011-1013, 1014	IC104 [A3 7] - IC100 [QD 11]
1011-1014, 1015	IC104 [A4 6] - IC101 [QA 14]
1011-1015, 1016	IC104 [A5 5] - IC101 [QB 13]
1011-1016, 1017	IC104 [A6 4] - IC101 [QC 12]
1011-1017, 1018	IC104 [A7 3] - IC101 [QD 11]
1011-1018, 1019	IC104 [A8 25] - IC102 [QA 14]
1011-1019, 101A	IC104 [A9 24] - IC102 [QB 13]
1011-101A, 101B	IC104 [A10 21] - IC102 [QC 12]
1011-101B, 101C	IC104 [A11 23] - IC102 [QD 11]
1011-101C, 101D	IC104 [A12 2] - IC103 [QA 14]
1011-101D	IC100, 101, 102, 103 [CLK 2] -, [CLR 1] -

- COLOR CHECK OF BUF1

101E	IC104 [A13 26] -, [A14 1] -

- DATA BUS SYSTEM CHECK OF BUF2

101F	IC204 [D0 11] - IC205 [A0 2], IC205 [BO 18] -
1020	IC204 [D1 12] - IC205 [A1 3], IC205 [B1 17] -
1021	IC204 [D2 13] - IC205 [A2 4], IC205 [B2 16] -
1022	IC204 [D3 15] - IC205 [A3 5], IC205 [B3 15] -
1023	IC204 [D4 16] - IC205 [A4 6], IC205 [B4 14] -
1024	IC204 [D5 17] - IC205 [A5 7], IC205 [B5 13] -
1025	IC204 [D6 18] - IC205 [A6 8], IC205 [B6 12] -
1026	IC204 [D7 19] - IC205 [A7 9], IC205 [B7 11] -
101F-1026	IC205 [DIR 1] -, IC204 [WR 27] -, IC204 [OE22] -

- ADDRESS SYSTEM CHECK OF BUF2

1027	IC204 [A0 10] - IC200 [QA 14], IC204 [A1 9] - IC200 [QB 13]
1028	IC204 [A1 9] - IC200 [QB 13]
1027,1028,1029	IC204 [A2 8] - IC200 [QC 12]
1027-1029,102A	IC204 [A3 7] - IC200 [QD 11]
1027-102A,102B	IC204 [A4 6] - IC201 [QA 14]
1027-102B,102C	IC204 [A5 5] - IC201 [QB 13]
1027-102C,102D	IC204 [A6 4] - IC201 [QC 12]
1027-102D,102E	IC204 [A7 3] - IC201 [QD 11]
1027-102E,102F	IC204 [A8 25] - IC202 [QA 14]
1027-102F,1030	IC204 [A9 24] - IC202 [QB 13]
1027-1030,1031	IC204 [A10 21] - IC202 [QC 12]
1027-1031,1032	IC204 [A11 23] - IC202 [QD 11]
1027-1032,1033	IC204 [A12 2] - IC203 [QA 14]
1027-1033	IC200, 201, 202, 203 [CLK 2] -, [CLR 1] -

- COLOR CHECK OF BUF2

1034	IC204 [A13 26] -, [A14 1] -

- CHECK OF BUF

1035	IC501, IC502 [A/B 1] -, IC503 [1A 2], [2B 6] -, IC310 [13] -, IC308 [1, 5] -, of BUF signal system.

- CHECK OF DCK GENERATION PORTION

1036	IC402 [8 to 13] -, IC403 [1 to 6] -, IC306 [1 to 3] -, IC303 [1 to 3] -, IC300 [FTCI57, FTOA58, P62 59, P63 60] -
1037	IC402 [8 to 13] -, IC403 [1 to 6] -, IC306 [1 to 3] -, IC300 [FTCI57, FTOA58, P62 59] -

FMY-15 BOARD SELF DIAGNOSIS ERROR MESSAGE TABLE

ERROR CODE	CONTENT
2001	Poor condition of data bus RDD0 to 3, GDD0 to 3, BDD0 to 3 or RAS or CAS0 between IC200 and D-RAM (IC201 to IC205, and IC211 to IC215, IC221 to IC225 on MEM-96 board).
2002	Poor condition of address bus AA0 to 11 or RAS or CAS0 between IC200 and D-RAM (IC201 to IC205, and IC211 to IC215, IC221 to IC225 on MEM-96 board). Or poor condition of D-RAM or IC200.
2003	Poor condition of data bus RD0 to 7, GD0 to 7, BD0 to 7 between IC106, 107, 108 and IC200. Or poor condition of data bus RY0 to 7, GY0 to 7, BY0 to 7 between IC102 and IC200. Or poor condition of D-RAM or IC200 or IC132 peripheral.
2004	Poor condition of data bus RD0 to 7, GD0 to 7, BD0 to 7 between IC106, 107, 108 and IC200. Or poor condition of data bus RY0 to 7, GY0 to 7, BY0 to 7 between D-RAM and IC102 . Or poor condition of D-RAM or IC200 or IC106, 107, and IC108 peripheral.
2005	Poor condition of data bus MAIN0 to 7 between IC102 and IC104. Or poor condition of data bus D0 to 7 between IC104 and IC105. Or poor condition of IC102 or IC104 or IC105 or IC200.
2006	Poor condition of D-RAM (IC201 to IC205, IC211 to IC215, IC221 to IC225 on MEM-96 board).

5-2. ADJUST MODE

1. Construction

ADJUST MODE is added ADJUST item to menu of service mode. ADJUST is constructed as follows.

• ADJUST   LETTER/A4
                Std
                Lami
                VOLT
                BCD D/A
                RIBBON D/A
                OHP D/A

2. How to enter

```
READY
        A4      QTY     1S
        OR
        LET
```

While ready condition of service mode (above indication), it is entered in ADJUST mode by depressing [←] and [→] keys simultaneously.
In ADJUST MODE, usual operations are possible. ADJUST MODE is released by turning off the power switch.

3. Content

When entering in ADJUST MODE, LCD indication becomes as follows.

```
┌─────────────────────────────────┐
│ READY                           │
│          A4      QTY      1A     │
└─────────────────────────────────┘
              OR
              LET
```

In this condition, it is entered in menu by depressing [MENU] key. Setting items are as follows.
- LETTER/A4 (Selection of letter or A4 paper)

    Selection paper size by depressing [←] or [→] key.
- Std (Gamma correction selection for standard media)

    CG .... For CG market

    P1 .... For photograph market
- Lami (Gamma correction selection for lamination media)

    L1 .... There is a masking.

    L0 .... There is no masking.

Above three items are set according to the destination of model.

    UC model ....LETTER, P1, L0

    J, CE model ..... A4, CG, L0
- VOLT (Fine adjustment of head voltage)

    LCD indication is as follows.

```
┌─────────────────────────────────┐
│ VOLT = 17.7 [+0.0]              │
│ R = 4257 (ohm) ↕                │
└─────────────────────────────────┘
```

Number at left side of voltage value is the head voltage value that is calculated from average resistance value of the head built in the unit. (Head temperature 35 ˚C, starting point when printing the ordinary paper.) If the most density is not obtained at this voltage, fine adjustment should be performed by depressing [←] or [→] key. Fine adjustment voltage is indicated at inside of [ ] of right side.
- BCD D/A (Bar code sensor luminance quantity adjustment)
- RIBBON D/A (Ribbon code sensor luminance quantity adjustment)
- OHP D/A (OHP sensor luminance quantity adjustment)

    Bar code, ribbon code and OHP sensors are adjusted to the most LED luminance quantity using D/A converter. When replacing each sensor or EEPROM, the adjustments should be performed.
- BCD D/A

    Ribbon cassette is inserted and it is adjusted by depressing [→] key.   This adjustment is needed two or three times repeatly to obtain the most suitable value. In case readjustment is needed, following indication is appeared, it is adjusted by depressing [→] key again.

```
┌─────────────────────────────────┐
│ BCD D/A                         │
│ SENSOR ERROR                    │
└─────────────────────────────────┘
```

- RIBBON D/A

    Ribbon cassette should be set the position to see only the cyan portion. And cassette is inserted to the unit. It is adjusted by depressing [→] key.
- OHP D/A

    Ensure that paper is not entered in the unit. It is adjusted by depressing [→] key.

5-3. FMY PRINTING (For UP-D70A only)

Test pattern printing is also performed in ordinary mode by operating front key only. Color steps is written in memory by depressing both [STOP] and [MENU] keys simultaneously. After that, print is performed by depressing PRINT key.

It is different from test pattern in service mode, print is performed through FMY-15 board. But, adjustment of COLOR ADJUST is not reflected. Be carefull, ribbon remaining quantity is changed by this printing.
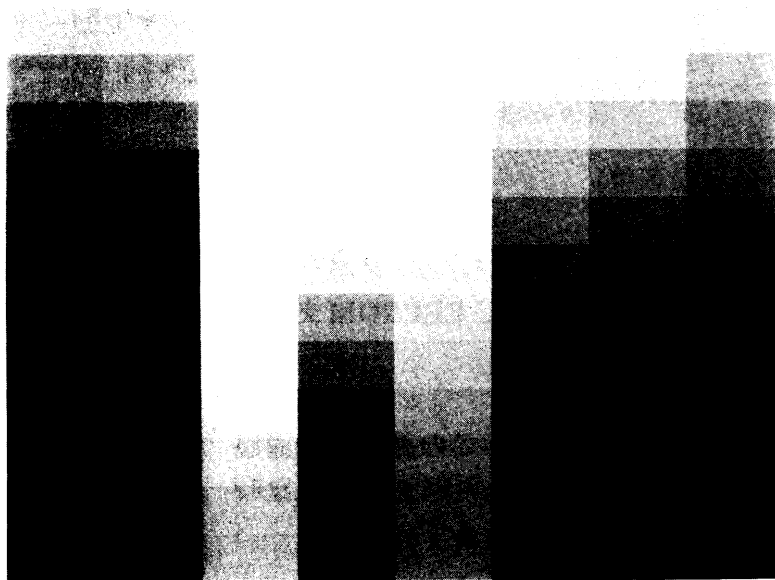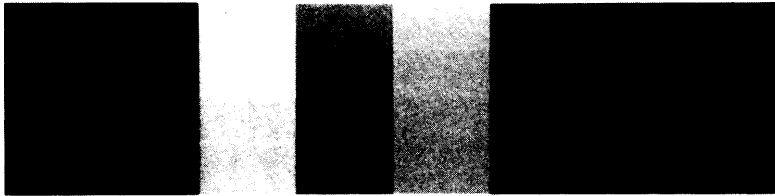
5-4. PRINT CONFIRMATION OF UP-D70

 In case UP-D70, since IF-610 board and FMY-15 board are not assembled, built-in test patterns as described before can not be printed.

 But, following patterns can be printed.

1. When P890/891 is attached,
    Built-in pattern of P890/891 can be printed by depressing PRINT and STOP keys
    simultaneously during READY mode.

2. When P890/891 is not attached, (Only printer)
    Gray pattern generated at SY board can be printed.
    Print can be performed by depressing PRINT key during ready mode of ADJUST MODE.

5-5. RESET OF EACH KIND SETTING VALUE

All kind setting values are kept at EEPROM. If it is necessary, all kind setting values can be reset to initial value.

1. Reset of EEPROM
   Perform this reset when replacing EEPROM or MEC-11 board (has EEPROM).
   How to Enter .... After entering service mode, while [STOP] key is depressed, [↑] and [↓]
   keys should be depressed in the ready condition of service mode
   (following picture) in order.

   ```
   READY
          A4      QTY      1S
          OR
          LET
   ```

   Content .... following values are returned to the initial value.
   user setting value : each value of COLOR ADJUST, GRAY ADJUST
   printer condition : ribbon remaining, each error information, TOTAL
   PRINT quantity, threshold value of sensor
   setting value : paper size, gamma selection, head voltage value,
   luminance quantity of sensor

2. Reset when shipping product
   User setting value, TOTAL PRINT, ribbon remaining quantity are changed.
   How to Enter .... After removing a ribbon cassette and a paper feed tray, while depressing
   [PRINT], [STOP] and [MENU] keys simultaneously, POWER switch
   should be turned on.
   Content .... Thermal head position should be set to 1. Following values (they are not
   adjusted when shipping) are returned to initial value.
   user setting value : each value of COLOR ADJUST and GRAY ADJUST
   printer condition : ribbon remaining quantity, each error information,
   TOTAL PRINT

3. TOTAL PRINT reset
   Total printing quantity of thermal head is returned to 0. When replacing thermal head, this
   reset should be performed.
   How to Enter .... Total printing quantity is indicated from TOTAL PRINT item in service
   mode.

   ```
   TOTAL = 10057
   ```

   After that, [↑], [↓] and [PRINT QTY] keys should be depressed simultaneously.

5-6. NOTE ON THE UNIT TRANSPORTATION

After repairing operation, following processes should be performed not to damage the unit by vibration while its transportation.

1. A ribbon cassette and a paper feed tray should be removed from the unit.
2. While STOP key is depressed, head position should be set at position 1 by depressing [←] and [→] keys simultaneously.
3. Power switch should be turned off.

SECTION 6
TROUBLE SHOOTING

6-1. MECHANICAL SECTION

Trouble	Cause	Countermeasure
Feed paper tray is not pulled out.	1 : Paper is out of tray.	1 : Remove paper delivery tray, return the paper to the paper feed tray.
	2 : Push ratch defective.	2 : Replace the push ratch.
	3 : Paper feed lever is not returned and is risen.	3 : If paper feed lever drive cam is transformed, replace it.
		3 : If paper feed lever drive cam is bent, replace the mechanism deck.
Ribbon cassette is not pulled out.	1 : Ribbon is removed from ribbon holder.	1 : Set the ribbon to the ribbon holder correctly.
		1 : If the ribbon holder is defective, replace the ribbonholder.
	2 : Head is not risen to the home position.	2 : If head drive arm is removed, assemble it correctly.
		2 : If head drive arm is damaged, replace the head drive axis ass'y.
Paper is not out from the tray.	1 : Pick up roller is slipped.	1 : Replace the pick-up roller.
	2 : Paper curls.	2 : Replace the paper.
	3 : Paper feed lever is not risen.	3 : Replace the paper feed lever ass'y.
Papers are sent more than two sheets.	1 : Limiter defective.	1 : Replace the limiter.
	2 : Separation roller is slipped.	2 : Replace the separation roller.
	3 : Paper is stuck on somewhere.	3 : Replace the paper.
Paper is sent slantly.	1 : Paper guide (S) of paper feed tray is bent.	1 : Replace the paper guide (S).
	2 : Roller is slipped.	2 : If the pick-up roller is slipped, replace it.
		2 : If the paper feed roller is slipped, replace it.
		2 : If the separation roller is slipped, replace it.
	3 : Edge sensor defective.	3 : Correct the edge sensor attached portion of paper delivery guide (B).
		3 : Replace the edge sensor.
		3 : Replace the paper delivery guide (B).
Paper is stopped at the halfway of paper feeding.	1 : Head is not risen at correctly position.	1 : If the head drive arm is removed, assemble it correctly.
		1 : If the head drive arm is damaged, replace the head drive axis ass'y.
		1 : Replace the take up motor.
	2 : Ribbon is not moved.	2 : Replace the take up motor.
	3 : Paper curls.	3 : Replace the paper.
	4 : PATH 0 sensor defective.	4 : Replace the PATH 0 sensor.
	5 : Edge sensor defective.	5 : Replace the edge sensor.
	6 : Paper is caught up to harness.	6 : Dress the harness correctly.
When feeding the paper, paper is bent.	1 : Paper curls.	1 : Replace the paper.

Trouble	Cause	Countermeasure
Paper is stopped at halfway of printing.	1 : Ribbon is rolled up.	1 : Replace the take up motor.
	2 : Ribbon is stuck on.	2 : Replace the SY board.
Paper is stopped at halfway of rewinding paper.	1 : Color is not registered.	1 : Refer to "Mis-registration color in print".
	2 : Paper is shorter than ordinary paper.	2 : Replace the paper.
	3 : Ribbon is stuck on paper	3 : Replace the take up motor.
		3 : Replace the supply motor.
		3 : Replace the SY board.
	4 : Paper is stuck on paper feed guide.	4 : Replace the paper feed guide.
	5 : Size sensor defective.	5 : Replace the size sensor.
	6 : Setting of letter and A4 size is mistake.	6 : Set the paper size correctly.
When delivering the paper, paper is stopped.	1 : Ribbon is stuck on the paper.	1 : Replace the take up motor.
		1 : Replace the supply motor.
		1 : Replace the SY board.
	2 : Papers heap at delivery exit.	2 : Remove the paper.
Ribbon is rolled up.	1 : Take up motor defective.	1 : Replace the take up motor.
Improper head contact.	1 : Defective of head attachment.	1 : Head should be attached correctly.
	2 : Platen defective.	2 : Replace the platen.
	3 : Head drive arm defective.	3 : If the head drive arm is removed, assemble it correctly.
		3 : If the head drive arm is damaged, replace the drive axis ass'y.
	4 : Head guide (S) defective.	4 : Replace the head guide (S).
	5 : Heat sink defective.	5 : Replace the heat sink.
Unevenness color in print.	1 : Platen defective.	1 : Replace the platen.
Horizontal toward unevenness density in print.	1 : Head defective.	1 : Replace the head.
Horizontal line in print.	1 : Dust is attached to the head.	1 : Clean the head with a soft cloth dampened with ethyl alcohol.
	2 : Head defective.	2 : Replace the head.
Vertical line in print.	1 : Ribbon is slipped.	1 : Replace the ribbon.
	2 : Pulley or gear defective.	2 : Replace the pulley or gear.
	3 : Supply motor defective.	3 : Replace the supply motor.
Mis-registration color in print.	1 : Ribbon tension setting is not correctly.	1 : The tension should be set correctly.
	2 : Take up motor defective.	2 : Replace the take up motor.
	3 : Supply motor defective.	3 : Replace the supply motor.
	4 : Grease of take up side worm gear is short.	4 : Supply the grease.
	5 : Paper is sent slantly.	5 : Refer to "Printing paper is sent slantly".
	6 : Edge sensor defective.	6 : Correct the edge sensor attached portion of paper delivery guide (B).
		6 : Replace the paper delivery guide (B).
	7 : Rubber of capstan is clogged.	7 : Clean the capstan.
	8 : Ribbon defective.	8 : Replace the ribbon.
Frill in print.	1 : Ribbon tension setting is not correctly.	1 : The tension should be correctly.
	2 : Ribbon defective.	2 : Replace the ribbon.

6-2. ELECTRICAL SECTION

• The unit has self diagnosis function. If the unit can be entered in service mode, perform self diagnosis (See service mode.)
• If error indicating is appeared, see SY-270 and MEC-11 boards circuit operation descriptions.

1. Contents of trouble

a) When turning on power switch and establishing modes.
   (1) After power switch is turned ON, the indication is not appeared in the liquid crystal.
   (2) Liquid crystal indication "DIGITAL COLOR PRINTER UP-D70" are not changed.

b) When connecting with computer.
   (1) The unit is not recognized by the PC.
   (2) Only poor print from PC (Test pattern print is normal.)

c) When printing
   (1) Printing operation is done, but nothing is printed.
   (2) Mis-registration of print.
   (3) There is a horizontal white line and data failure.

2. Cause and countermeasure

a) After power switch is turned ON, the indication is not appeared on the liquid crystal.

Does alarm turn on and off when ribbon cassette or paper feed tray is put in and out?

NO → Check CPU operation on SY-270 Board.

YES → Check CN6 or IC107 on SY-270 Board, or LCD panel unit.

Does back light of LCD light?

NO → Is TP-1 on SY-270 Board 5 V? (5 V system check)

YES (back light) → Does TP113 on SY-270 Board become H?

YES (TP-1) → Check LCD panel unit or harness.

NO (TP-1) → When harness from SY-270 to Power Supply is disconnected, is ① through ③ of harness 5 V?

Does TP113 on SY-270 Board become H?

NO → Check reset signal. → Check peripheral of IC111 on SY-270 Board. (Check reset IC.)

YES → Does clock appear at TP114 on SY-270 Board?

NO → Check CPU signal. → Check X101 on SY-270 Board.

YES → Check peripheral of IC101 on SY-270 Board. (Check CPU.)

When harness from SY-270 to Power Supply is disconnected, is ① through ③ of harness 5 V?

YES → Check short of 5 V system in each board.

NO → Check Power Supply.

b) Liquid crystal indication │ DIGITAL COLOR PRINTER UP-D70 │ is not changed.

Option board
is surely inserted again.
Does unit recover ?

—NO→

YES
↓

OK

When pulling only
IF-610 Board out, does
unit recover?

—NO→

YES
↓

Check BUS connector and
ICs of 300 through on IF-610 Board.

When pulling only
FMY-15 Board out, does
unit recover?

—NO→

YES
↓

Check IC115, 105 through 108,
IC132 and peripheral BUS
connector on FMY-15 Board.

When
pulling both IF-610 and
FMY-15 Boards out, does
unit recover?

—NO→

YES
↓

Check CN1 through 3,
IC105, IC102 and
IC307 on SY-270 Board.

(Check communication part.)

Check IC101 on
SY-270 Board.

(Check CPU.)

c) The unit is not recognized by the PC.
   Check S300, peripheral of IC301 and peripheral of IC400 through on IF-610 board.

d) Poor print only from PC (Test pattern print is normal.)
   Check on IF-610 Board.　　IC400　㊽ through ㊿

Correction:

c) The unit is not recognized by the PC.
   Check S300, peripheral of IC301 and peripheral of IC400 through on IF-610 board.

d) Poor print only from PC (Test pattern print is normal.)
   Check on IF-610 Board.　　IC400　㊸ through 54
   　　　　　　　　　　　　　IC105　① through ⑨, ⑲
   　　　　　　　　　　　　　IC206　① through ⑨, ⑲
   　　　　　　　　　　　　　IC401
   　　　　　　　　　　　　　IC402　① through ⑥

e) Printing operation is done, but nothing is printed.

```
          ┌─────────────────────┐
          │  Is the harness     │  NO    ┌──────────────────┐
          │  inserted to head   │──────▶ │ Poor connection  │
          │  correctly ?        │        │ of harness.      │
          └─────────────────────┘        └──────────────────┘
                   │ YES
                   ▼
          ┌─────────────────────┐
          │  Is power supply    │  NO
          │  head connector ④   │────────────────┐
          │  through ⑥ more     │                │
          │  than 17 V ?        │                ▼
          └─────────────────────┘        ┌─────────────────────┐  NO
                   │ YES                  │  Is CN10 ⑧ on       │──────────────┐
                   │                      │  SY-270 Board more  │ (Check V cont.)
                   │                      │  than 1.5 V?        │              │
                   │                      └─────────────────────┘              │
                   │                              │ YES                        │
                   │                              ▼                            ▼
                   │                      ┌──────────────┐       ┌───────────────────────┐
                   │                      │ Check Power  │       │ Check IC110 and       │
                   │                      │ Supply.      │       │ IC101 on SY-270 Board.│
                   │                      └──────────────┘       │ ( Check D/A           │
                   │                                             │   converter and CPU. )│
                   │                                             └───────────────────────┘
                   ▼
          ┌─────────────────────┐
          │  When pulling       │  NO
          │  FMY-15 Board out,  │────────────────┐
          │  using only IF-610  │                │
          │  Board, is test     │                ▼
          │  pattern printing   │        ┌─────────────────────┐  NO
          │  normal?            │        │  When pulling       │──────────────┐
          └─────────────────────┘        │  IF-610 Board out,  │              │
                   │ YES                  │  using only FMY-15  │              │
                   ▼                      │  Board, is test     │              │
          ┌──────────────────┐            │  pattern printing   │              │
          │ Check CN201 A-⑮  │            │  normal?            │              │
          │ on FMY-15 Board. │            └─────────────────────┘              │
          └──────────────────┘                    │ YES                        │
                                                   ▼                            ▼
                                          ┌──────────────────┐   ┌────────────────────────────┐
                                          │ Check CN101 ⑫,   │   │ Check head control block on│
                                          │ ⑬, ⑮ on IF-610   │   │ SY-270 Board refferring to │
                                          │ Board.           │   │ timing chart of SY-270 and │
                                          └──────────────────┘   │ MEC-11 Boards operation    │
                                                                 │ description.               │
                                                                 └────────────────────────────┘
```

f) Mis-registration of print.

```
                                          ┌─────────────────┐
                                          │  ┌───────────┐  │
                                          │  │    AA     │  │
                                          │  └───────────┘  │
                                          └─────────────────┘


        ╱╲
       ╱  ╲
      ╱ Is take-up motor ╲
     ╱ normal? (There is no abnormal ╲    NO        ┌──────────────┐
     ╲ sound or uneveness rotation or ╱ ─────────→  │ Replace take-up│
      ╲ slow rotation.) ╱                           │ motor.         │
       ╲  ╱                                         └──────────────┘
        ╲╱
        │ YES
        ↓
        ╱╲
       ╱  ╲
      ╱ Is CN403 ①, ② on ╲  NO
      ╲ MEC-11 Board more than 20 V? ╱ ────┐  ⎛ Check drive voltage ⎞
       ╲  ╱                                │  ⎝ of capstan motor.   ⎠
        ╲╱                                 ↓
        │ YES                      ┌──────────────┐
        ↓                          │ Check Power  │
  ┌──────────────┐                 │ Supply.      │
  │ Mechanism failure.│            └──────────────┘
  └──────────────┘
```

g) There is a horizontal white line and data failure.

```
                                                    ┌─────────────┐
                                                    │ ┌─────────┐ │
                                                    │ │/////////│ │
                                                    │ └─────────┘ │
                                                    │ ┌─────────┐ │
                                                    │ │/////////│ │
                                                    │ └─────────┘ │
                                                    └─────────────┘

        ╱╲
       ╱  ╲   Is data failure      NO
      ╱    ╲  width more than ───────────────────────────────────────────┐
      ╲    ╱  10 mm?                                                      │
       ╲  ╱                                                               │
        ╲╱                                                                ▼
         │ YES                                                           ╱╲
         │                                                              ╱  ╲   Is print         NO
         ▼                                                             ╱    ╲  changed by cleaning ──────────┐
        ╱╲                                                             ╲    ╱  the head?                     │
       ╱  ╲   Is CN7 ⑬ through    NO                                    ╲  ╱                                 │
      ╱    ╲  ⑳ on SY-270 Board ──────────┐                              ╲╱                                  │
      ╲    ╱  normal?                     │                               │ YES                              │
       ╲  ╱                               │                               │                                 │
        ╲╱                                │                               ▼                                 ▼
         │ YES                            ▼                       ┌─────────────────┐        ┌─────────────────┐
         │                     ┌─────────────────────┐           │ Head defective. │        │ Stain of head.  │
         ▼                     │ Check peripheral of │           └─────────────────┘        └─────────────────┘
        ╱╲                     │ IC210 on SY-270 Board.│
       ╱  ╲   Is CN7 ⑤ through  └─────────────────────┘
      ╱    ╲  ⑫ on SY-270 Board  NO
      ╲    ╱  normal?      ──────────┐
       ╲  ╱                          │
        ╲╱                           │
         │ YES                       ▼
         │               ┌─────────────────────┐
         ▼               │ Check peripheral of │
        ╱╲               │ IC209 on SY-270 Board.│
       ╱  ╲   Is CN7 ①   └─────────────────────┘
      ╱    ╲  through  NO
      ╲    ╱  ④ on SY-270 Board ──────────┐
       ╲  ╱  normal?                      │
        ╲╱                                │
         │ YES                            ▼
         │                     ┌─────────────────────┐
         ▼                     │ Check peripheral of │
  ┌──────────────────────┐     │ IC208 on SY-270 Board.│
  │ Check peripheral harness│   └─────────────────────┘
  │ between head and SY-270 │
  │ Board, or head defective.│
  └──────────────────────┘
```

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